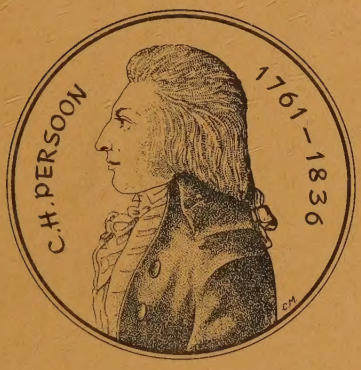
Volume 1 1960 Part 3

# PERSOONIA

A Mycological Journal

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Editors: H. J. Lam, M. A. Donk, R. A. Maas Geesteranus

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# NOTES ON AGARICALES—II

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(With 21 Text-Figures)

*Galerina uncialis*, originally described as a species growing on mossy trunks, but found to be growing in abundance on terrestrial mosses, is redescribed and compared with other annulate species of *Galerina* of the open country. *Pholiota pumila* sensu F. H. Möller is redescribed as *Galerina moelleri* nov. spec., and *Galera pumila* f. *oreina* J. Favre reduced to the synonymy of *Galerina moelleri*. *Pholiota pumila* var. *subferruginea* Möller & Lange is regarded as a nomen dubium. Attention is drawn to the fact that *Galerina unicolor* (Vahl ex Sommerf.) Sing. in its original sense is a terrestrial species. The new combination *Galerina praticola* is proposed, and the microscopical description of the species supplemented.

For several years I have collected in the coastal dunes a species of *Galerina*, growing in abundance on mosses during late autumn, and which I was not able to determine. It has the general appearance of *Galerina marginata* and the microscopical characters of *G. uncialis*. After also having collected the true *G. uncialis* on mossy trunks, I realized that the specimens from the dunes represent a large terrestrial form of *G. uncialis*, which thus far was known only as a truncicolous species. As I could not find any morphological differences between the two forms except their dimensions (and even these overlap), there is no reason to separate taxonomically both forms (for description see p. 308).

As no record of a terrestrial form of *G. uncialis* could be found in literature, I checked the other European annulate, field-inhabiting species of *Galerina*.

Several of the species which were taken into consideration appeared insufficiently known, hence I have brought together all available information.

*Agaricus pumilus* Pers., Syn. Fung. 317. 1801; *ex* Fr., Syst. mycol. **1**: 263. 1821. — *Pholiota pumila* (Pers. ex Fr.) Gill., Hym. 432. 1876. — *Galera pumila* (Pers. ex Fr.) J. Favre, Champ. sup. Zone alp. 149. 1955 (not validly published; basinym not cited). — *Galerina pumila* (Pers. ex Fr.) M. Lange *in* Medd. Grönland **148** (2): 37. 1957 (not validly published; basinym not cited).

Judging from the description I think *Agaricus pumilus* Pers. should be placed in *Agrocybe* Fayod. Unfortunately there is no type in Persoon's herbarium at Leiden. However, there is material of *Agaricus semiorbicularis* Bull., which Persoon (1828: 163) placed as a variety under *A. pumilus* and which without any doubt belongs to *Agrocybe*. Moreover, the citation of Schaeffer's Plate 203 (1770) by Persoon, at first

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(1801) with a question mark, but afterwards (1828) more positively, also points to a species of this genus.

Because in his "Systema" Fries (1821) almost verbally copied Persoon's description, his *Agaricus pumilus* Pers. ex Fr. consequently is the same species of *Agrocybe*.

In his "Elenchus Fungorum" (1828: 29), Fries gave a new interpretation of *Agaricus pumilus*, which is the basis of the present misapplication of this name and its isonyms to a species of *Galerina*.

*Agaricus pumilus* Pers. ex Fr. *sensu* Fr., Elench. Fung. 29. 1828; Icon. sel. Hym. **2**: 5, pl. 105 fig. 4. 1877.

This is a pale, slender *Galerina* growing in fields and resembling *G. marginata*. From the illustration and the description alone it is in my opinion impossible to conclude precisely which species of *Galerina* is represented.

In the herbarium at Uppsala there are six collections of a fungus, all from meadows in the neighbourhood of Femsjö, determined as *Pholiota pumila* by Dr. S. Lundell. To one of these collections he added a note stating that he knew this fungus only from Femsjö and that it is apparently a pale, terrestrial form of *Galerina marginata*.

I have been unable to find constant differences between *Pholiota pumila* sensu Lundell and *Galerina marginata*. Among the large number of collections of *G. marginata* in the Uppsala herbarium several are quite similar to *Pholiota pumila* sensu Lundell, but were collected on wood.

Very likely *Agaricus pumilus* sensu Fr. 1828 is identical with *Pholiota pumila* sensu Lundell and I consider both of them forms of the very variable *Galerina marginata*. Because the latter is as yet not well defined, notes on the dried material of *Pholiota pumila* sensu Lundell follow:

Cap 5–15 mm across, convex to plano-convex, without or with a faint umbo, ochraceous or rusty ochraceous, smooth and glabrous. Gills 18–25 with 1–3 lamellulae between each pair, broadly adnate to subdecurrent, dull rusty ochraceous brown, with whitish edge. Stalk 17–30 × 0.3–2 mm, cylindrical, concolorous, not or hardly darker at base, pruinose and often slightly costate at apex, with fugacious fibrillose or submembranaceous, whitish annulus; basal part with scattered white fibrils; base somewhat whitish tomentose.

Spores 8.5–10.5 × 5–6.5 $\mu$, ellipsoid-subamygdaloid with slightly conical apex, rather rough, with conspicuous, large plage, with exospore hardly loosening, moderately pseudoamyloid, pale brownish yellow in $NH_4OH$, moderately darkening in KOH. Basidia 4-spored. Pleurocystidia 54–68 × 13–15 (apex 3–5) $\mu$, broadly ventricose-fusiform with tapering necks. Cheilocystidia 48–58 × 8–14 (apex 2–4) $\mu$, smaller and more slender than pleurocystidia. Cuticle hardly distinguishable, a very thin gelatinous layer formed by very thin hyphae. Trama of gills subregular, consisting of hyphae up to 25 $\mu$ thick. Clamps present.

Collections examined.—

SWEDEN: S m å l a n d, Femsjö, 18 Sept. 1940 (UPS 2085), 26 Sept. 1940 (UPS 2086), 1 Oct. 1940 (UPS 2087), 1 Oct. 1940 (UPS 2088), and 2 Oct. 1940 (UPS 2089); all leg. *S. Lundell* s.n.

*Pholiota pumila* (Pers. ex Fr.) Gill. *sensu* F. H. Möller, Fungi Faeröes **1**: 229, fig. 106. 1945.

This species, extensively described by Möller, bears a striking external resemblance to the terrestrial form of *Galerina uncialis*. Thanks to the kindness of Dr. M. Lange, I was enabled to examine material from the Faroes and Greenland.

*Pholiota pumila* sensu Möller differs from *G. marginata* by the large, slightly ornamented spores (9.5–12.5 × 6.5–8 μ) and from *G. uncialis* by the presence of pleurocystidia, large spores, etc. It certainly deserves specific rank, but is in need of a new name, because in this case *Pholiota pumila* is a misapplied name, as has been pointed out in the foregoing.

I propose the name *G. moelleri* (see p. 310), to honour the Danish mycologist who gave the first clear description of this species and who contributed so much to the knowledge of the European Agaricales.

*Pholiota pumila* var. *subferruginea* Möller & Lange *apud* Lange, Fl. agar. dan. **3**: 59. 1938 (not validly published); **5**: vii. 1940. — *Galerina subferruginea* (Möller & Lange apud Lange) Kreisel *in* Feddes Rep., Beih. **137**: 163. 1957.

Occasionally one comes across these names in enumerations of species, but it is difficult to find out what exactly they stand for.

Lange (1938: pl. 109 fig. F.) depicts a fungus which has much in common with *Galerina moelleri* on account of its smooth spores and slender, bottle-shaped cystidia. In this connection, however, it may be remarked that the spores and cystidia of *Pholiota unicolor* and *P. marginata* illustrated on the same plate (fig. A, A′, and B) are very similar! In the description neither the ornamentation of the spores, nor the presence or absence of pleurocystidia are mentioned.

Neither Dr. M. Lange (in litt.), nor Mr. F. H. Möller (in litt.) were able to trace authentic material. Consequently, the figure of Lange (1938: pl. 109 fig. F) has to be considered type. As both lectotype and type-description lack information on some of the most important features in the genus *Galerina*, the name *Pholiota pumila* var. *subferruginea* has to be abandoned as a nomen dubium.

Mr. H. Kreisel (in litt.) informed me that he did not preserve the material on which he reported under the name of *Galerina subferruginea*. The description suggests *G. uncialis* on account of the hair-like cheilocystidia, thickening towards the base, and the rough spores, measuring 8.2–10 × 5–6 μ.

Thanks to the kindness of Dr. R. W. G. Dennis, I was enabled to examine the material of *Pholiota pumila* var. *subferruginea* as recorded by Pearson (1952: 111). The spores were found to be 9.6–10.8(–14.9) × 5.6–6.1 μ, moderately rough, with plage, with exospore not or hardly loosening; the cheilocystidia and pleurocystidia (the latter overlooked by Pearson) (30–)50–75 × 9–18 (neck 2.5–7) μ. This collection belongs to a group of terrestrial species close, or forms belonging, to *G. marginata*.

It is quite possible that *Pholiota pumila* var. *subferruginea* is identical with *Pholiota pumila* sensu Fr. (1828), Lundell. It is, however, impossible for me to substantiate this suggestion. Mr. F. H. Möller informed me that the type-locality is cultivated now.

*Galera pumila* f. *oreina* J. Favre, Champ. sup. Zone alp. 204. 1955.

The late Dr. J. Favre was so kind as to send to me some specimens of this Alpine fungus. It differs widely from *G. uncialis* by the very slightly roughened spores, and the broad necks (3–4.5 $\mu$) of the cystidia. The pleurocystidia were overlooked by Favre. This fungus does not differ essentially from *G. moelleri* (see p. 310).

*Pholiota praticola* F. H. Möller, Fungi Faeröes **1**: 231. 1945.

An examination of the type revealed slender, rough spores with a conspicuously loosening exospore, and cheilocystidia with rather broad necks (2.5–5 $\mu$) (see p. 313).

*Agaricus unicolor* Vahl *in* Fl. dan. **6** (18): 7, pl. 1071 fig. 1. 1792; *ex* Sommerfelt, Suppl. Fl. lapp. Wahl. 261. 1826. — *Galerina unicolor* (Vahl ex Sommerf.) Sing. *in* Beih. bot. Zbl. (Abt. B) **56**: 170. 1936.

It may seem strange to compare this species with a terrestrial one, because the name *Galerina*, or *Pholiota*, *unicolor* has nearly always been applied to a wood-loving species. Yet Vahl stated, "In pratis Norvegiae". Vahl's plate shows a fungus which may represent anyone of the field-inhabiting annulate species of *Galerina*. As further information is lacking, I prefer to consider *Agaricus unicolor* Vahl a nomen dubium.

If one wants to indicate material of the validating author (Sommerfelt) as type, *Agaricus unicolor* Vahl ex Sommerf. would indeed be a wood-inhabiting species. Sommerfeldt mentioned, "Hab. in acervis assularum putridarum Saltdalen Nordlandiae passim". Then, however, one should rather write "(Sommerf. non Vahl)".

*Agaricus marginatus* Batsch, Elench. Fung., Cont. 2: 65, pl. 37 fig. 207. 1789; *ex* Fr., Epicr. 169. 1838. — *Galerina marginata* (Batsch ex Fr.) Kühner, Genre Galera 225. 1935.

Although, as a rule, this species grows on wood, terrestrial forms are occasionally met with. Perhaps *G. marginata*, in Europe, comprises a group of species, including some terrestrial ones. I am unable to disentangle these at the moment, since such an attempt requires a greater number of collections with detailed field-notes, as are actually at my disposition.

*Galerina marginata* s.l. is characterized by a more or less annulate stalk, broad (8–20 $\mu$) pleurocystidia, and moderately to very rough spores, 8.5–10.5 × 5–6.5 $\mu$, darkening in KOH, with more or less loosening exospore.

*G. uncialis* is easily distinguished from *G. marginata* by the lack of pleurocystidia and the very thin necks of the cheilocystidia. These two species are sometimes very similar as to habit.

*Pholiota muscigena* Quél. *in* C.R. Ass. franç. Av. Sci. **14**: 446, pl. 12 fig. 5. 1886 (Champ. Jura Vosges, Suppl. 14: 4). — *Dryophila unicolor* var. *muscigena* (Quél.) Quél., Ench. Fung. 69. 1886.

This pale, slender, vernal species, growing on mosses in peat bogs, looks rather characteristic, to judge from the figure and the description. Confusion with *Galerina uncialis* seems impossible. Authentic material or material from the type locality (coast near Bordeaux) is needed to record the microscopical features.

*Galerina jaapii* Smith & Singer *in* Mycologia **47**: 574. 1955 [= *Galerina mycenoides* (Fr.) Kühner sensu Jaap, Kühner].

I mention this species for the sake of completeness only. It stands rather apart among the annulate, field-inhabiting species of *Galerina* on account of its slender stipe, which is naked except for a thin annulus, and of its membranaceous cap. The large, nearly fusiform spores, the 2-spored basidia, the absence of pleurocystidia and the cheilocystidia with broad necks and (sub)capitate apices, preclude any confusion with the other species treated in this paper.

*Agaricus rufidulus* Kalchbr. *apud* Fr., Hym. europ. 226. 1874. — *Pholiota rufidula* (Kalchbr. apud Fr.) Sacc., Syll. Fung. **5**: 761. 1887.

The description of this vernal species from Hungary with its umbilicate cap and marginal veil, strongly reminds one of *Tubaria furfuracea* sensu lato.

I have compared *Galerina uncialis* with all of the descriptions of new species of *Galerina*, recently published by Smith and Singer (Smith 1953, Smith & Singer 1955, 1958), but could not find any that might be conspecific.

As appears from the foregoing there are at present known at least five field-inhabiting annulate species of *Galerina* in Europe, viz. *G. jaapii*, *G. moelleri* (= *Pholiota pumila* sensu F. H. Möller), *G. praticola*, *G. uncialis*, and *G. marginata*. The first three are exclusively terrestrial; *G. uncialis* grows also on mossy trunks, and *G. marginata* grows as a rule on wood.

In the classification of the genus *Galerina* as proposed by Smith & Singer (1957), the five species mentioned above represent four stirpes belonging to two sections. They certainly do not form a natural group. Yet some of them are very difficult to distinguish without the microscope. Especially *G. uncialis*, *G. moelleri*, and *G. marginata* sensu lato look sometimes very similar and, hence, I use only microscopical features in the key below.

PROVISIONAL KEY TO THE ANNULATE, FIELD-INHABITING SPECIES OF GALERINA IN EUROPE

1a. Pleurocystidia absent.
  2a. Cheilocystidia with necks very slender, 1–3(–4) $\mu$ broad, sometimes subcapitate. Spores 7.5–10 × 5–6.5 $\mu$, very rough, with tightly fitting exospore. *G. uncialis* (p. 308)
  2b. Cheilocystidia with broader necks or distinctly capitate. Spores larger or with loosening exospore.
    3a. Spores with conspicuously loosening exospore. . . . . 5a
    3b. Spores with tightly fitting exospore, 11–15 × 5.5–7.5 $\mu$. *G. jaapii*
1b. Pleurocystidia present.
  4a. Spores slightly to moderately rough, slightly to moderately darkening in KOH, 9.5–12.5 × 6.5–8 $\mu$, with tightly fitting exospore. Pleurocystidia 50–85 × 7–14 $\mu$. *G. moelleri* (p. 310)
  4b. Spores rough to very rough, moderately to strongly darkening in KOH *or* with loosening exospore.
    5a. Spores 10.5–13 × 6–7.5 $\mu$, slender, with conspicuously loosening exospore, hardly darkening in KOH. Cheilocystidia 35–60 × 5–14 $\mu$. Pleurocystidia similar but scarce. *G. praticola* (p. 313)

5b. Spores rarely exceeding 10.5 μ, darkening in KOH, with exospore loosening or not. Pleurocystidia mostly 10–20 μ wide.
Terrestrial forms of *G. marginata* and related species

## GALERINA UNCIALIS (Britz.) Kühner

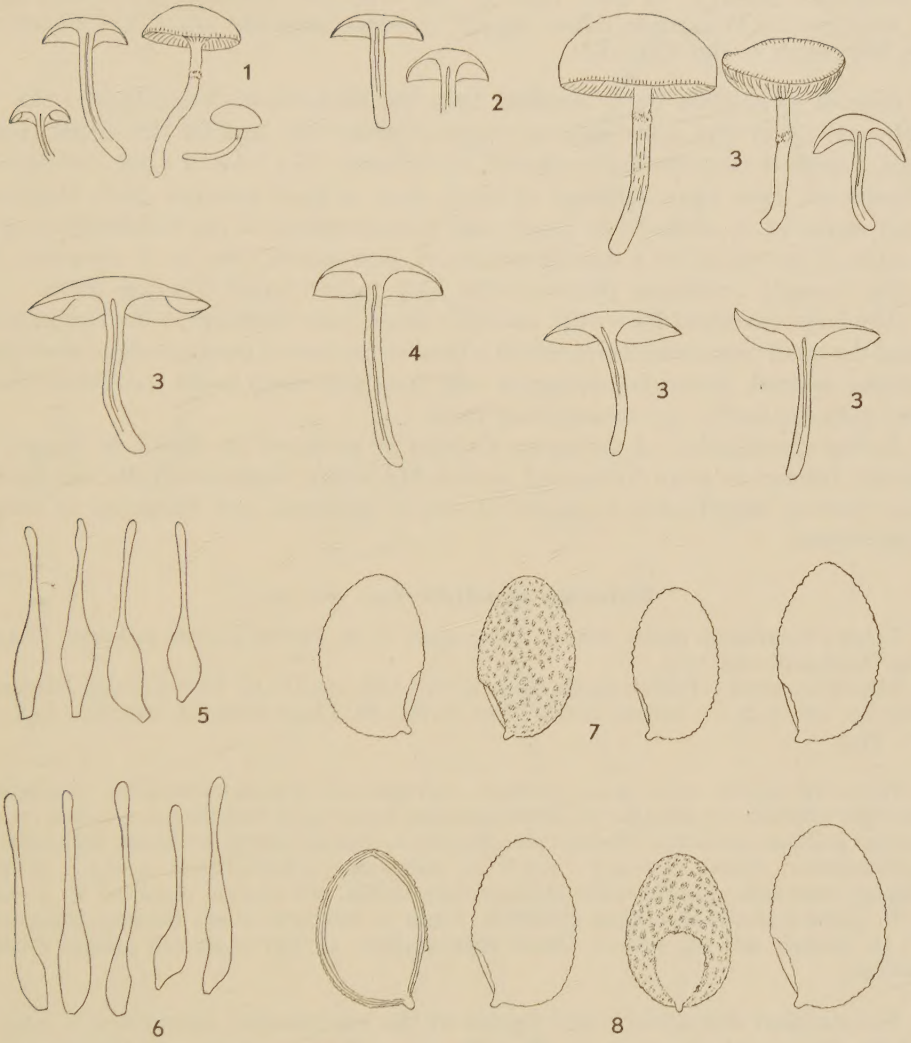
*Agaricus uncialis* Britz. *in* Ber. naturw. Ver. Schwaben **30**: 21, fig. 231. 1890; Hymen. Südbayern **6**: 21, tab. 248, fig. 231. 1890 (non vidi); *in* Bot. Zbl. **77**: 397. 1899. — *Naucoria uncialis* (Britz.) Sacc., Syll. Fung. **11**: 59. 1895. — *Galerina uncialis* (Britz.) Kühner, Genre Galera 217. 1935.

Fruit-bodies small to very small, gregarious, sometimes subfasciculate. Cap 5–22(–30) mm, hemispherical to plano-convex, rarely to plano-concave, sometimes conico-convex, margin slightly involute at first, sometimes revolute in old specimens, smooth and glabrous, rather fleshy, hygrophanous; when moist, yellowish orange-brown to orange-brown when young, darker with age, to dull reddish brown, slightly paler near margin, somewhat shiny and greasy; when dry, pale ochraceous buff to rusty buff with centre slightly browner, dull. Gills 15–28, with (1–)3–7(–10) small ones between each pair, rather distant to rather crowded, adnate or adnexed, subdecurrent in small specimens, with edge slightly concave or straight at first, becoming ventricose, from brownish ochraceous to rather dark rusty brown (Séguy 191); edge whitish. Stalk 12–27 × 0.8–3 mm, cylindrical or slightly attenuated or thickened towards base, pale yellow-brown to dull orange-brown, becoming dark reddish brown near base, slightly pruinose at top, with white fibrillose annular zone; lower part with appressed white to isabella fibrils, glabrescent with age; base somewhat whitish to brownish tomentose. Flesh glassy yellow-brown when moist, dark reddish brown in base of stalks of old specimens, much paler when dry. Taste and smell strong, farinaceous. Spore print rather dark reddish rusty brown (± Séguy 146).

Spores 7.5–10(–10.5) × 5.0–6.5 μ, broadly subamygdaloid to ellipsoid, very rough, with distinct plage, with tightly fitting exospore, yellow-brown in water, ferruginous in $NH_4OH$, rather dark reddish brown in KOH. Basidia 24–35 × 6.5–9 μ, 4-spored, cylindrical to clavate, often slightly constricted in the middle, sometimes mixed up with similarly shaped or wrinkled yellowish bodies. Pleurocystidia none. Cheilocystidia numerous, 33–61 × 6–12 μ, slender to very slender lageniform or fusiform with long, very slender necks, 1–3(–4) μ broad, rarely subcapitate, rarely with yellowish contents. Trama of gills regular to subregular, beneath subhymenium with 2–4 μ wide hyphae, in centre hyphae 8–12 μ wide, pale orange in water; subhymenium very thin, 5–10 μ, ramose-subcellular. Cuticle 40–70 μ thick, with subradial to interwoven, 2–4 μ wide hyphae, upper layer of 20–50 μ thick gelatinizing when growing older. Trama of cap with 4–15 μ wide hyphae, which are interwoven in centre and upper part and radially arranged above gills. Trama of stalk with longitudinal hyphae 2–4 μ in diameter near surface, up to 15 μ in centre, gradually passing into trama of cap; outermost hyphae slightly spaced and interstices filled with hyaline matter. Pigment in all parts of trama incrusting, yellow-brown, becoming darker in $NH_4OH$ and KOH; some hyphae of cuticle and of surface of stalk with yellowish opaque intracellular matter; vascular hyphae scarce in all parts of trama, opaquely yellowish. Clamps present.

Habitat.—In late autumn on mosses in coastal dunes, sometimes on mossy trunks (Bas 1180). In nine out of the ten collections mentioned below associated with *Hypnum cupressiforme*.

Collections examined.—




Figs. 1–8. *Galerina uncialis* (Britz.) Kühner: 1–4—carpophores × 1; 5–6—cheilocystidia × 500; 7–8—spores × 2500 (1, 5 and 7 from *Bas 1180*; 2 from *Maas Geesteranus 8125*; 3, 6 and 8 from *Bas 1184*; 4 from *Bas 746*).

NETHERLANDS:

F r i e s l a n d: Terschelling, Boschplaat, 21 Oct. 1956, *W. J. Reijnders 2191* (herb. Reijnders).

N o o r d - H o l l a n d: Castricum, 3 Oct. 1954 and 13 Oct. 1954, *G. D. Swanenburg de Veye* (L).

Z u i d - H o l l a n d: Katwijk, 28 Oct. 1951, *R. A. Maas Geesteranus 8125* (L); Leiden, 12 Dec. 1956, *C. Bas 1180* (L); Noordwijk, 19 Dec. 1954, *C. Bas 746* (L);

Noordwijk—Katwijk, 13 Dec. 1956, *C. Bas 1184* (L); Oostvoorne, 11 Nov. 1957, *C. Bas 1376* (L); Wassenaar, 6 Nov. 1957, *R. A. Maas Geesteranus 12449* (L); Wassenaar 25 Nov. 1957, *C. Bas 1391* (L).

*Galerina uncialis* has been recorded from the Netherlands twice before, viz. by Schweers (1939: 37; name only, no material preserved), and by Herregods (1951: 155). I studied the collection mentioned by the latter (G e l d e r l a n d: Deutekom, Gaanderen, Dec. 1937, *Schweers*) of which there is dried material (herb. Huijsman 824), material in alcohol (no. 3459), and a water-colour in the Rijksherbarium at Leiden. It proved to be a terrestrial form of, or a species close to, *G. marginata*, for it has broadly ventricose pleurocystidia with rather broad tapering necks.

The large terrestrial form of *G. uncialis* is much more common in the Netherlands than the small truncicolous one, which is smaller because of poor growing-conditions. Among normal, terrestrial specimens one finds sometimes small specimens which are quite similar to the truncicolous form.

In the classification of the genus *Galerina* as proposed by Smith & Singer, *G. uncialis* belongs to stirps *Triscopa* of section *Mycenopsis*. Macroscopically this species has a strong resemblance to species of stirpes *Autumnalis* and *Marginata* of section *Naucoriopsis*.

**Galerina moelleri** Bas, *spec. nov.*

*Galera* (*Naucoriopsis*) *pumila* (Fr.) J. Favre sensu F. H. Möller f. *oreina* J. Favre, Champ. sup. Zone alp. 204. 1955.

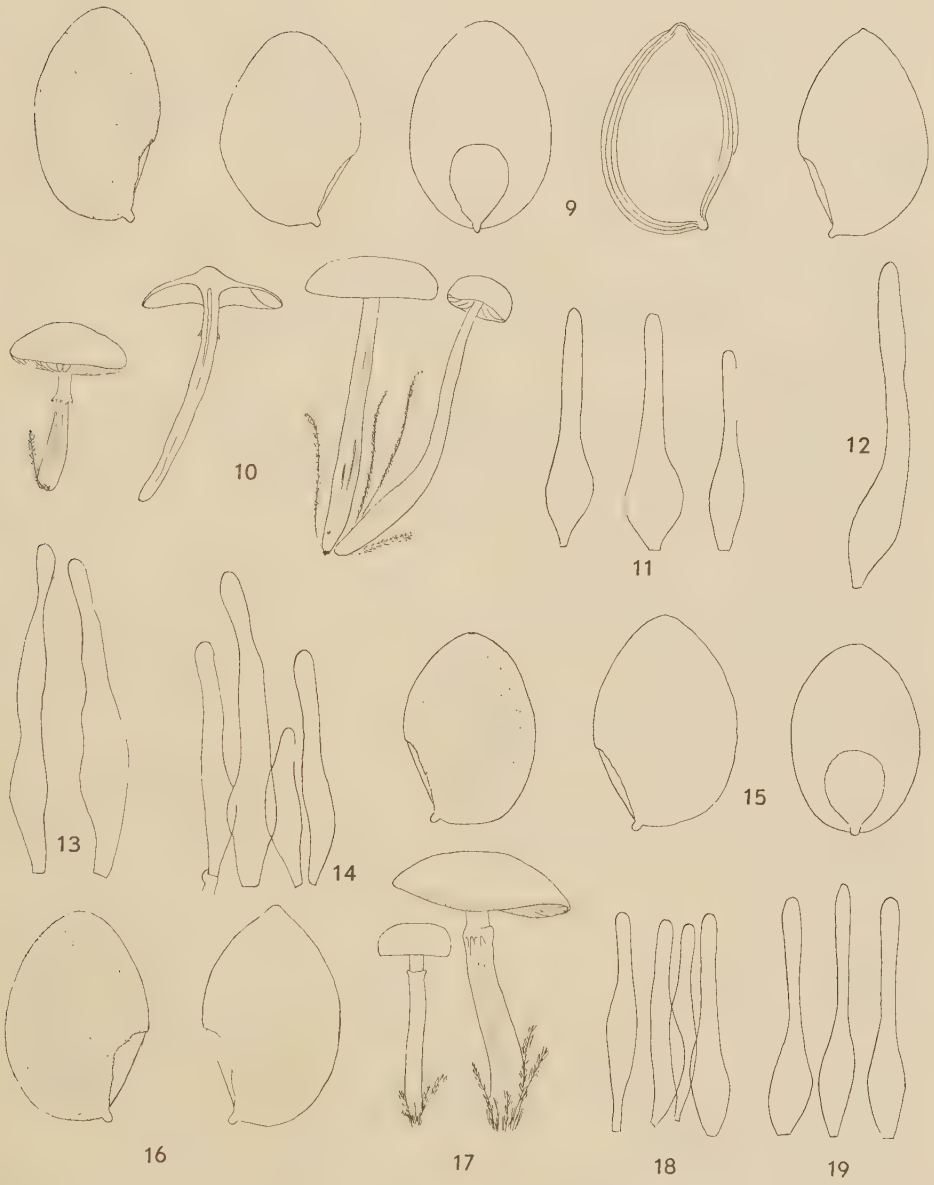
MISAPPLICATIONS.—*Pholiota pumila* (Pers. ex Fr.) Gill. *sensu* F. H. Möller, Fungi Faeröes **1**: 229, fig. 106. 1945. — *Galerina pumila* (Pers. ex Fr.) M. Lange *in* Medd. Grönland **148** (2): 37. 1957.

Pileus 10–20(–30) mm latus, convexus, ferrugineo-brunneus, substriatus, subviscidus; lamellae subdistantes, adnatae vel subdecurrentes; stipes 20–35 mm longus, 2–7 mm crassus, sursum pallidus, pruinosus, deorsum albo-fibrillosus, demum pallide brunneus, annulatus vel subannulatus; sporae 9.5–12.5 × 6.5–8 $\mu$, subrugosae; cheilocystidia 40–65 × 5–14 $\mu$, anguste ventricosa; pleurocystidia cheilocystidiis similia, sed majora, usque ad 85 $\mu$ longa.

In pratis muscosis borealibus et alpinis. Typus in Herbario Musei Botanici Hauniensis: F. H. Moeller sine no, Faeröes Österö Slattaratinde, 17 VII 1938, sub nomine *Pholiotae pumilae*.

For detailed descriptions and figures of the macroscopic characters, I refer to Möller (l.c.), and also to Favre (l.c.). However, I may add my notes on the microscopical features.

Spores 9.5–12.5(–13.3) × 6.5–8 $\mu$, broadly ellipsoid-ovoid, sometimes with faint apical papilla, slightly, rarely moderately, roughened to nearly smooth, plage present and rather conspicuous, exospore not loosening, pale yellowish-brownish in $NH_4OH$, slightly to moderately darkening in KOH (paler than spores of *G. marginata* in KOH), slightly to moderately pseudoamyloid. Cheilocystidia 40–65 × 5–14 (neck 3–5.5) $\mu$, slender lageniform, to subcylindrical, rarely subcapitate. Pleurocystidia present, but sometimes rare, 50–85 × 7–14 (neck 3–5.5) $\mu$, similar in shape to cheilocystidia or more slender. Basidia 4-spored. Cuticle con-




Figs. 9–19. *Galerina moelleri* Bas: 9, 15, and 16—spores × 2500; 10 and 17—carpophores × 1; 11, 14, and 18—cheilocystidia × 500; 12, 13, and 19—pleurocystidia × 500 (9–12: from type; 10: after Möller; 13–15: from *Terkelsen 42*; 16, 18, and 19: from *Favre s.n.*, 20 Aug. 1943, Haut val Sessenna; 17: after Favre).

sisting of a layer of filiform, 2–5 μ wide hyphae; upper part gelatinized. Clamps present.

Habitat.—On mosses in alpine and boreal fields and marshes (not on *Sphagnum*).

Distribution.—Greenland, Faroes and Alps. Probably also Iceland (P. Larsen, 1932: 542, "*Pholiota marginata*"; Christiansen, 1941: 211, "*Pholiota marginata*"; M. Lange, 1949: 297, "*Pholiota praticola*"), and Lappland (M. Lange, 1957: 37, "*Galerina pumila*").

Collections examined.—

GREENLAND: Godthåb, 12 Aug. 1955, *F. Terkelsen 14* (in part) (C); Egedesminde, 16 Aug. 1955, *F. Terkelsen 42* (C); Godhavn, 23 Aug. 1955, *F. Terkelsen 76* (C); Christianshåb, 4 Sept. 1955, *F. Terkelsen 127* (C).

FAROES: Osterö, Slattaratinde, 17 July 1938 (type) and 5 Aug. 1938, *F. H. Möller s.n.* (C); Saxen, 23 July 1938, *F. H. Möller s.n.* (C).

SWITZERLAND: Canton des Grisons, Haut val Sessenna, 20 Aug. 1943, *J. Favre s.n.* (herb. Favre).

This species is rather well characterized by the large and slightly roughened spores with tight exospore, the slender cheilo- and pleurocystidia, and habit. It certainly belongs to stirps *Autumnalis* of section *Naucoriopsis* of the genus *Galerina* as defined by Smith & Singer (1957: 452).

*Galerina moelleri* has many features in common with another terrestrial species within this stirps, viz. *G. subochracea* A. H. Smith (1953: 917). However, the spores of *G. moelleri* are considerably larger.

Terrestrial species close, or forms belonging, to *G. marginata* may show a great resemblance to *G. moelleri* but are distinguishable by smaller spores which become considerably darker in KOH, by a more strongly ornamented, often slightly loosening exospore, and by broader pleurocystidia.

Möller and Favre both overlooked the pleurocystidia. However, I observed them in all collections mentioned above, though they may be rare. Especially in the type, of which the cells are hard to re-inflate, it is difficult to find the pleurocystidia. Nevertheless I have chosen this collection as type, because Möller's figures were drawn after it.

Favre made the Alpine fungus a form of *Pholiota pumila* sensu Möller (that is, *Galerina moelleri*), on account of its larger spores, shorter cystidia, and more conspicuous annulus. I found the following measurements: fungus from Faroes, spores 9.3–12.3(–13.3) × 6.2–8.1 μ and cystidia (pleurocystidia included) 42–77 × 8.5–14 μ; Alpine fungus, spores 10.7–12.4 × 7.2–8 μ and cystidia (pleurocystidia included) 40–67 × 5–11 μ. I do not think these differences are really significant. The more or less pronounced annulus is also a variable character, as may be seen from Möller's illustration.

The following collections cited by Möller under *Pholiota pumila* do not belong to *Galerina moelleri*: Faroes: Nolsö 1938, *N. Petersen s.n.* (small, smooth spores with pore; chrysocystidia—Strophariaceae); Strömö, Legnumvatn 30 VII 1938; *F. H. Möller s.n.* (*Galerina praticola?*, see p. 313).

From the collections recorded by M. Lange from Greenland under the name *Galerina pumila*, the following are tc be excluded: *M. Lange 125* (rather small and

very rough spores, very broad cystidia—aff. *G. marginata*); *Terkelsen 14* in part (very large smooth spores). I did not study Scholander's collections from Greenland.

**Galerina praticola** (F. H. Möller) Bas, *comb. nov.*

*Pholiota praticola* F. H. Möller, Fungi Faeröes **1**: 231, fig. 107b, pl. 2 fig. 4. 1945. — Type: Faroes, Nolsö, 25 VIII 1938, *F. H. Möller s.n.* (C).

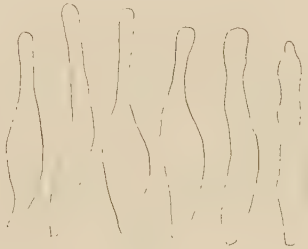
According to Möller, this is a pale, slender, terrestrial fungus resembling *G. marginata*. For a complete macroscopic description, I may refer to Möller. A study of the type revealed the following microscopical features:

Spores 10.6–12.8(–13.5) × 6.1–7.6 μ, slender, amygdaliform, moderately rough with smooth plage, with a rather conspicuously loosening exospore, pale brownish golden yellow in $NH_4OH$, hardly darkening in KOH, very faintly pseudoamyloid. Cheilocystidia 35–60 × 5–14 μ, necks 2.5–5 μ, tips 3–6 μ, slender fusiform or subcylindrical, sometimes subcapitate, rarely capitate. Pleurocystidia present but rare, similar to the cheilocystidia. Cuticle a layer of subradial, cylindrical, 3–7 μ broad hyphae. Clamps present.

I was not aware of the importance to be attributed to the presence or absence of a gelatinous pellicle, when I studied the type, and therefore did not pay sufficient attention to this character. From the description of the outer characters one would expect such a pellicle to be present.

*Galerina praticola* may be distinguished from *G. moelleri* by the slender spores with loosening exospore and from *G. marginata* by the large, faintly pseudoamyloid spores, hardly darkening in KOH.

The collection, *F. H. Möller*, 30 July 1938, Faroes, Strömö, Legnumvatn (C) named *Pholiota pumila*, may also be mentioned here, for it has the same slender spores with loosening exospore. However, the spores are slightly smaller, 9.5–12.3 × 5.4–6.1 μ.




Figs. 20–21. *Galerina praticola* (F. H. Möller) Bas: 20—spores × 2500; 21—cheilocystidia × 500 (20–21: from type).

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# THE STROBILOMYCETACEAE OF INDONESIA

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(With six Text-figures)

*Strobilomyces nigricans* Berk., and *Boletellus emodensis* (Berk.) Sing. are new records for Indonesia. *Porphyrellus dictyotus* Boedijn is proposed as a new species.

The family of the Strobilomycetaceae, first established by Gilbert (2) and later much extended by Singer (4), was hitherto represented in Indonesia only by three species belonging to three different genera. I can add now three more species, bringing the total number to six and the number of genera to four.

Short diagnoses are provided for every species, in which colour notes followed by (R) were made with the aid of R. Ridgway, "Color standards and Color nomenclature". Of all the species mentioned in this paper, except *Boletellus obscure-coccineus* (Höhn.) Singer, material mostly preserved in alcohol will be found in the Herbarium of the Botanical Garden, Bogor, Indonesia.

## Strobilomyces Berk.

*Strobilomyces* Berk. *in* Hook. J. Bot. & Kew Gdn Misc. **3**: 77. 1851.

### Strobilomyces polypyramis Hook. f. apud Berk.

*Strobilomyces polypyramis* Hook. f. *apud* Berk. *in* Hook. J. Bot. & Kew Gdn Misc. **3**: 78. 1851.

Pileus at first hemispherical, then expanding, up to 8 cm in diam., dirty brown, completely covered by nearly black, floccose, angular scales; in the young stage a veil extends from the pileus to the stipe; this veil is also covered by floccose scales; cap margin in older stages appendiculate with the remains of the veil. Tube-layer 6–8 mm high, decurrent on the stipe, brown. Pores at first pure white, afterwards brown, 1–1.5 mm in diam. Flesh floccose and spongy, dirty white, becoming dark bistre on exposure to the air. Stipe long and slender, often somewhat sinuous, solid, sulcate-striate, brown, covered with dark floccose scales, 7–12 cm long, 10–12 mm broad. Basidia 4-spored, 35–45 × 14–15 $\mu$. Spores broadly ovoid, red-brown, covered with irregular, nearly black tubercles, which are often confluent, giving rise to short, sometimes branched, ridges and a crest near the top of the spore; 9–14 × 7–10 $\mu$. Cystidia vesicular, 50–58 × 12–17 $\mu$. — In old age and after conservation (alcohol) the whole fungus takes a dull black colour.

Java, Bogor, Botanical Garden, collector unknown (BO).

The type from Sikkim was studied at the Kew Herbarium.

### Strobilomyces nigricans Berk.

*Strobilomyces nigricans* Berk. *in* Hook. J. Bot. & Kew Gdn Misc. **4**: 139. 1852.

Pileus convex, with appressed angular scales, 4–5 cm in diam., greyish brown, about Wood Brown (R), with the scales dull black, margin appendiculate with remnants of the veil. Tubes up to 10 mm long, grey near Drab (R). Pores at first whitish, soon grey, between Smoke Grey and Light Greyish Olive (R). Flesh up to 7 mm thick near the stipe, rapidly diminishing in width near the margin; colour grey near Drab Grey (R). Stipe, solid, with an elongated reticulum of black fibres, 5–6 cm long, 7–14 mm broad, about the same colour as the cap. Basidia club-shaped, 4-spored, 33–46 × 13–19 μ; sterigmata conical, 5–8 μ long, 1.5–3 μ broad at the base. Spores globose to subglobose, brown, with an irregular network of rather high bands, 13–15 × 10–13.5 μ; hyaline border 1–3 μ, in places only 0.5 μ high. Cystidia fusiform, colourless, 57–62 × 17–21 μ. — Whole fungus turning coal black after conservation in alcohol.

Java, Tjibodas, September 1929, *K. B. Boedijn 10.724* (BO); April 1952, *F. K. M. Steup* (BO).

The type of this species from Khasia was studied at the Kew herbarium.

## HEIMIELLA Boedijn

*Heimiella* Boedijn *in* Sydowia **5**: 216. 1951.

### HEIMIELLA RETISPORA (Pat. & Baker) Boedijn

*Boletus retisporus* Pat. & Baker *in* J. Straits Br. Asiat. Soc. **78**: 72. 1918. — *Boletellus retisporus* (Pat. & Baker) E. J. Gilb., Les Bolets 108. 1931 (alternative name, *Strobilomyces retisporus*). — *Heimiella retispora* (Pat. & Baker) Boedijn *in* Sydowia **5**: 217. 1951.

Pileus at first bell-shaped, often with an umbo, then expanding and margin locally reflexed, 5.5–8 cm in diam.; surface smooth, seldom cracking in some places; pale brown, darker in the centre. Tubes easily separable from the pileus, up to 1 cm long near the middle, up to 5 mm near the margin of the cap. Pores cream colour, at first rounded, afterwards more or less elongated and up to 0.5 mm in diam. Flesh pale yellowish, about 6 mm thick near the stipe, 1 mm near the margin Stipe long, solid, rugose, with more or less swollen base, brown, much darker than the pileus; 11–20 cm long, 1.5–3 cm broad at the base, 7–18 mm in the middle. Basidia club-shaped, 4-spored, 31–41 × 14–17 μ; sterigmata conical, 2.5–5 μ long, 2–2.5 μ broad at the base. Spores subovoid, dirty yellow to pale brownish yellow, reticulate, the reticulum consisting of raised, colourless bands of different height and often interrupted and irregular; 15–18 × 9–11 μ; hyaline border 1–1.5 μ, near the base of the spore sometimes up to 3 μ broad. Cystidia flask-shaped, thin-walled, necks of varying length, often slightly undulating or constricted, 53–74 × 11–14 μ, necks 4–6 μ broad.

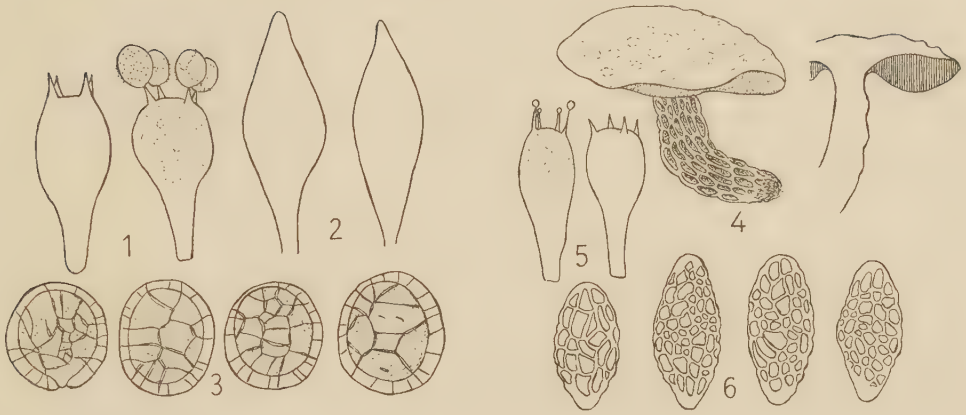
Java, Bogor, Botanical Garden, collector unknown (BO).

## PORPHYRELLUS E. J. Gilb.

*Porphyrellus* E. J. Gilb., Les Bolets 99. 1931.

### **Porphyrellus dictyotus** Boedijn, *nov. spec.*

Pileus 6–7 cm latus, convexus, tessellatus, albidus, squamulis melleis. Tubuli 10 mm longi, poris 1 mm diam., sordide roseis. Caro pallida, 9 mm crassa. Stipes solidus, profunde lacunoso-favosus, sordide luteus, 5.5–6 cm longus, 14–16 mm crassus. Basidia tetraspora, clavata, 36–40 × 12.5–14 μ. Sporae brunneae, fusoideae, irregulariter reticulatae, 14–19 × 6–8 μ.




Figs. 1–3. *Strobilomyces nigricans* Berk.: 1—basidia; 2—cystidia; 3—spores.

Figs. 4–6. *Porphyrellus dictyotus* Boedijn: 4—fructifications, one in section; 5—basidia; 6—spores.

Pileus convex 6–7 cm in diam., cracking in rather wide-spaced wart-like scales, nearly white, the scales dirty brownish, about Honey Yellow (R). Tubes strongly sinuate decurrent, about 10 mm high, diminishing in length near the stipe and the margin. Pores about 1 mm wide, dirty pink, about Vinaceous Fawn to Fawn Color (R). Flesh pale, about 9 mm thick near the stipe. Stipe cylindrical 5.5–6 cm long, 14–16 mm broad, alveolate-lacunose, the alveolae 3–9 mm long, dirty yellow, about Chamois (R). Basidia clavate, 4-spored, 36–40 × 12.5–14 $\mu$; sterigmata conical, 4–6 $\mu$ long, 1–2 $\mu$ broad at the base. Spores brown, about Cinnamon to Sayal Brown (R), fusoid, with an irregular network of low ridges, 14–19 × 6–8 $\mu$. — In alcohol the whole fructification takes a rose colour.

Java, Tjiseureuh, Gunung Limo, September 1935, *K. B. Boedijn* 15.054 (type; BO).

## BOLETELLUS Murr.

*Boletellus* Murr. *in* Mycologia **1**: 10. 1909.

### BOLETELLUS EMODENSIS (Berk.) Sing.

*Boletus emodensis* Berk. *in* Hook. J. Bot. & Kew Gdn Misc. **3**: 48. 1851. — *Boletellus emodensis* (Berk.) Sing. *in* Ann. mycol., Berl. **40**: 18. 1942.

*Strobilomyces annamiticus* Pat. *in* Bull. Soc. mycol. France **25**: 6. 1909.

*Strobilomyces porphyrius* Pat. & Baker *in* J. Straits Br. Asiat. Soc. **78**: 72. 1918.

Pileus convex 3–9 cm in diam., covered with scales, red, about Deep Hellebore Red (R) but a trifle paler, with the scales Corinthian Purple to Dark Corinthian Purple (R). Veil red, about Corinthian Red (R), in the young stage surrounding the whole cap and the top of the stipe, later forming an appendiculation on the margin of the pileus. Pores subangular, dark yellow, about Olive Ocher to Olive Yellow (R), turning blue-green by pressure. Flesh yellowish, strongly blueing when cut. Stipe cylindrical, up to 10 cm long, 1 cm broad, dirty brown, about Wood Brown (R), changing to red, about Corinthian Red (R) near the apex. Basidia clavate, 4-spored, 40–60 × 10–14 $\mu$. Spores elongate-ellipsoid, olive brownish,

between Isabella colour and Ecru Olive (R), striate in longitudinal direction with low ridges, 15–20 × 8–10 μ. Cystidia fusiform, of about the same length as the basidia.

Java, Tjiseureuh, Gunung Limo, September 1935, *K. B. Boedijn 15.056* (BO).

*Strobilomyces porphyrius* Pat. & Baker I have placed as a synonym, as I cannot see any real differences from the present species.

### BOLETELLUS OBSCURE-COCCINEUS (Höhn.) Sing.

*Boletus obscure-coccineus* Höhn. *in* S. B. Akad. Wiss. Wien (Math.-nat. Kl., Abt. I) **123**: 88. 1914. — *Boletellus obscure-coccineus* (Höhn.) Sing. *in* Farlowia **2**: 127. 1945.

Pileus dry, granular felted, 6–7 cm in diam., dark carmine red. Pores yellow with often a greenish hue, about 1.5 mm in diam. Tubes about 1 cm long, diminishing in length near the stipe. Flesh 1 cm thick, of a pale colour, not blueing on exposure to the air. Stipe cylindrical, 10 cm long, 12–13 mm broad, attenuated near the base, pale carmine red, provided with red striae. Basidia 4-spored, 30–42 × 8.5–12.5 μ. Spores long-ellipsoid, honey coloured, striated by the presence of longitudinal low ridges, 16–21 × 6–8 μ. Cystidia clavate, mucronate, 60–100 × 12–24 μ.

Java, Tjibodas, 1908, *F. X. R. von Höhnel* (BO).

Description after von Höhnel (l.c.), and Singer (l.c.).

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# A NEW SCLEROGRAPHIUM FROM INDONESIA

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(With three Text-figures)

The new species *Sclerographium magnum* Boedijn is described.

The genus *Sclerographium* was created by Berkeley (1) for dark coloured Stilbaceous fungi, which have muriform conidia. Until now the only representative was the type species, *Sclerographium aterrimum* Berk., which was successively redescribed by von Höhnel (2) and Hughes (4). Another Phaeostilbaceous genus with muriform conidia is *Negeriella* P. Henn., but here the conidia cover the whole length of the synnema, whereas in *Sclerographium* they form a distinct head at the top of the stalk.

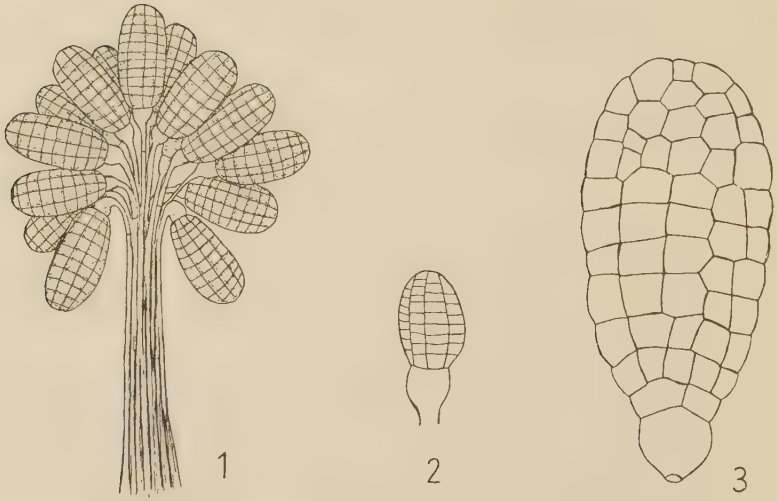
In Bogor, Indonesia, I collected a fungus, which possesses the chief characters of *Sclerographium*, viz. a dark coloured synnema bearing a head of large muriform conidia of the same colour. But this species is certainly not nearly related to *Sclerographium aterrimum* Berk. Every hypha of the synnema of the new species ends in a single very large conidium and the semiglobose end-swelling of the supporting thread remains attached to the base of the conidium when the latter is shed. Nevertheless, I would rather place the species under discussion in *Sclerographium*, because after all the classification of the Deuteromycetes is an artificial one, and in general characters our species fully agrees with the said genus.

**Sclerographium magnum** Boedijn, *nov. spec.*

Synnemata gregaria, olivacea. Stipes 240–400 μ longus, 37–61 μ latus, ex hyphis parallelis, pauce septatis, brunneis, 2.5–5 μ crassis compositus. Hypharum apices incrassati, pallide colorati, 8–16 μ diam. Conidia acrogena, solitaria, late ellipsoidea, glabra, muriformia, olivacea, 62–74 × 30–39 μ.

Synnemata in colonies of a dark blackish brown colour with a greenish hue, rather variable as to shape and dimensions. Stalk straight, 240–400 μ long, 37–61 μ broad at the base, 24–37 μ near the apex. Head more or less globose, 150–200 μ in diam. Stalk composed of strictly parallel, brown, unbranched, and sparingly septate hyphae, 2.5–5 μ broad. Each thread widens at the top into a semiglobose, pale coloured vesicle, 8–16 μ diam., on which a single conidium is formed. Conidia broadly ellipsoid, smooth, strongly muriform, at first pale greyish green, turning olivaceous brown at maturity, 62–74 × 30–39 μ, consisting in face view of about four rows of small, more or less cubical cells, 6–9 μ long. When shed the end-swelling of the supporting hypha remains attached to the base of the conidium.

Java, Bogor, Botanical Garden, on decaying leafstalk of a palm, March 1950, *K. B. Boedijn* (type; Herb. Boedijn).




Figs. 1–3. *Sclerographium magnum* Boedijn: 1—synnema; 2—young conidium; 3—mature conidium.

The youngest conidia observed are of about the same dimensions as the end-swelling of the supporting thread. They are subhyaline and show already a muriform arrangement of the delicate, small cells. Some aberrant conidia with irregular outline (lobed or even furcate) may sometimes be encountered.

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# NOTES SUR LE GENRE AGARICUS

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(Avec 6 figures dans le texte)

Descriptions et figures d'une espèce nouvelle et d'une espèce peu connue. Le binôme *Agaricus arenophilus* Huijsm. nom. nov. est proposé pour *Psalliota arenicola* Wakef. & Pears.

Dans les notes et les observations sur les Agaricales, que j'espère faire paraître régulièrement dans « Persoonia » et dans d'autres périodiques, je ferai usage des codes suivants pour l'indication des couleurs:

L. = J. Lange, Clef de Couleurs *in* Dansk bot. Ark. **4** (12). 1926;

S. = E. Séguy, Code Universel de Couleurs, 1926;

Expo. = A. Cailleux & G. Taylor, Code expolaire, 1958;

H.C.C. = Horticultural Colour Chart, édité par « The British Colour Council & The British Horticultural Society », **1**. 1938, **2**. 1941.

H.C.C. ne s'emploie que rarement et seulement pour indiquer certaines couleurs vives qui ne se trouvent pas dans les autres codes.

Quant à la clef de Lange, il est utile de savoir que a1–2, b1–3, f1–5, n2 et o2 sont très sensibles à la lumière, si bien que j'éviterai au plus possible de me référer à ces couleurs-là.

Je profite de cette occasion pour remercier une fois pour toutes M. Georges Becker qui veut bien vérifier la correction de mon texte.

**Agaricus niveolutescens** Huijsm., *spec. nov.*—Figs. 1–2

Pileo 24–40 mm lato, subumbonato, fere plano, sericeo-fibrilloso, niveo, tactu flavescente. Lamellis confertis, liberis, pallide griseo-lilacinis, dein fuscis, purpureo-tinctis. Stipite 50 × 4–5 mm, basi subbulbosa, albo vel flavido, tactu flavo vel flavo-aurantiaco; annulo in parte superiore stipitis, tenui, saepe lacerato, mox pendulo et stipiti applicato. Carne alba, vulnerata flavescente, odore amygdalino. Sporis 4.3–5.8 × 3.3–3.8 $\mu$, ellipsoideis. Basidiis tetrasterigmatibus. Cheilocystidiis vesiculosis vel subclaviformibus, 12–17 × 6–10 $\mu$. Ad latera viarum in fagetis. Typus in Herb. Lugd. Bat. (L 955.239–400).

Chapeau 24–40 mm, plan-convexe, subomboné, puis subplan, fibrillo-soyeux, d'un blanc éclatant, jaunissant instantanément par le moindre contact, pouvant devenir subvergetulé par des fibrilles radiales se colorant plus intensément que les autres. Couleur du chapeau du matériel d'herbier orangé vif, L. 16, plus foncée au centre. Lames assez serrées, lamelles ± 55, lamellules de deux longueurs, libres, assez étroites, subventrues, gris-lilacin pâle (sans rose) au commencement, devenant

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brun-purpurin ou chocolat, intermédiaire entre S. 112 et 708; arête blanche, finement fimbriée. Pied 50 × 4–5 mm, plein, parfois légèrement creux, s'épaississant vers la base subbulbeuse qui peut atteindre un diamètre de 9–10 mm, glabre au dessus de l'anneau, un peu fibrilleux en dessous, blanc, jaunissant fortement par le froissement et pouvant devenir même jaune orangé dans la partie basale; anneau supérieur, ténu, lacéré, jaunissant, pendant de bonne heure, étroitement appliqué au pied. Chair mince dans le chapeau, jaunissant par le contact bien que moins fortement que les revêtements; odeur d'amande amère. Réaction de Schaeffer: +. Spores 4,3–5,8 × 3,4–3,8 $\mu$, ellipsoïdes ou subellipsoïdes, peu foncées sous le microscope. Basides tétrasporiques, 19–22,5 × 5,7–7 $\mu$, subclaviformes.

Isolé ou subisolé sur terreau de feuilles au bord des sentiers dans les bois de Hêtres dans les environs de Lougres près de Montbéliard (Doubs, France); le 25 septembre, leg. *G. Becker* et *H. S. C. Huijsman* (type; L 955.239–400); le 5 août 1956, leg. *G. Becker* (L.).

*Agaricus niveolutescens* se distingue de ses congénères de petite taille par le revêtement du chapeau fibrillo-soyeux d'un blanc pur au début et jaunissant au moindre contact. Un exemplaire frais de cette espèce, observé d'en haut, ressemble tellement à un *Inocybe geophylla* blanc à mamelon peu marqué, qu'on risque de passer à côté sur le terrain. De temps en temps, mais pas toutes les années, M. G. Becker rencontre *A. niveo-lutescens*, en nombre très restreint, dans les bois autour de Lougres.

*Psalliota minima* Ricken (Blätt. Pilze 239, pl. 62 fig. 6. 1912), ressemble un peu à *A. niveolutescens*, mais est encore plus petit et a le chapeau « schmutzig-blass, derbhaarig-schuppig ».

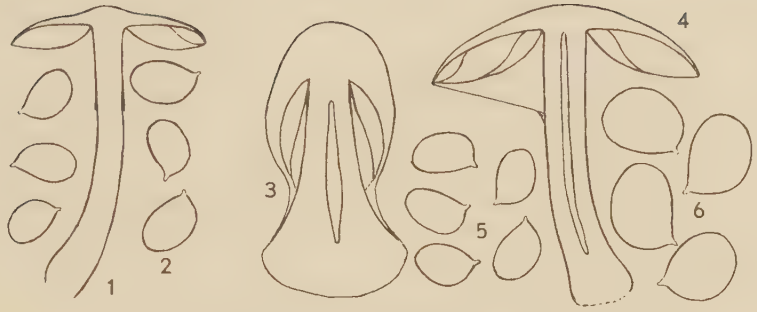
*Agaricus niveolutescens* appartient à la section hétérogène *Minores* Fries (Hym. eur. 281. 1874), plutôt caractérisé de façon culinaire que de façon botanique, (« in cibariis rejectis, pileo tenuiter carnoso »). En tant que les représentants européens de cette section artificielle appartiennent au genre *Agaricus* dans la conception moderne, on peut transférer *A. comtulus* Fr. (Epicr. 215. 1838), que je connais, à la section *Agaricus* [= *Campestres* Konr. & Maubl., Ic. sel. Fung. **6**: 60. 1927, *emend.* Singer *in* Lilloa **22**: 432. (1949) 1951]; les autres appartiennent à la section *Arvenses* Konr. & Maubl., l.c., emend. Singer, l.c.

C'est Fries lui-même (Hym. eur. 281. 1874) qui a déjà mis en reliëf que l'*A. comtulus*, avec ses lamelles rose-carné au début, est « *A. campestris* maxime affinis ». Cette affinité est encore soulignée par l'absence de cellules stériles à l'arête des lamelles [voir J. Lange *in* Dansk bot. Ark. **4** (12): 11. 1926], caractère en propre à l'*A. campester* et ses satellites.

C'est correctement que Heinemann, dans sa belle monographie des *Agaricus* du Congo belge (*in* Bull. Jard. bot. Brux. **26**: 32. 1956), verse *Minores* comme sous-section dans *Arvenses*. Par contre, il me semble peu soutenable qu'il indique *A. comtulus* comme espèce-type de cette sous-section.

### AGARICUS XANTHOLEPIS (Møll.) Møll.—Figs. 3–5

*Psalliota xantholepis* Møll. *in* Friesia **4**: 191, pl. 21 fig. 3 & pl. 36. 1951. — *Agaricus xantholepis* (Møll.) Møll. *in* Friesia **4**: 204. 1951 (nomen alternativum valablement publié).




Figs. 1–2. *Agaricus niveolutescens* Huijsm.: 1—section médiane × 1; 2—spores × 1540.
Figs. 3–5. *Agaricus xantholepis* (Møll.) Møll.: 3—section × 1,5; 4—section × 1; 5—spores × 1540.
Fig. 6. *Agaricus arenophilus* Huijsm.: spores × 1540.

Chapeau 25–55 mm, ellipsoïde avant l'ouverture, devenant peu à peu convexe après la rupture du voile, à marge appendiculée ou fimbriée au début, parfois restant attachée au pied jusqu'au plein épanouissement par une ou deux brides vélaires blanches ou jâunatres; revêtement sec, mat, jaunissant par le froissement, jaune-ocracé-alutacé (L. e3, nuancé de b6), un peu plus foncé dans la zone discale qui reste unie, ailleurs bientôt rompu en plaques ou en squames apprimées subimbriquées, fibrillo-tomenteuses, souvent vergetulées de jaune-brunâtre ou de brunâtre-orangé, entre lesquelles apparaît la chair blanchâtre; couleur du chapeau du matériel d'herbier orangé-ferrugineux, cuivré au centre. Lames serrées, lamelles ± 85, intercalées de lamellules de trois longueurs, libres, ventrues, d'abord blanchâtres ou beige très pâle, puis beige brunâtre ou beige grisâtre, à la fin bistre violeté; arête blanchâtre. Pied 30–45 × 5–8 mm, fistuleux d'emblée, généralement épaissi vers la base élargie-submarginée, avec un anneau supérieur submembraneux ténu, lacéré ou incomplet, blanc ou jaunâtre, surtout à la face inférieure, d'abord dressé ascendant, puis retombant, glabre au dessus de l'anneau, fibrilleux en dessous, blanc en haut, de plus en plus jaune vers la base, jaunissant encore plus fortement par le froissement. Chair blanchâtre, jaunâtre dans la partie inférieure du pied; odeur d'amande amère. Réaction de Schaeffer: +. Spores 4,5–5,5 × 3,2–3,6 $\mu$, ellipsoïdes ou subcylindriques, à base souvent tronquée et à apicule sublatéral. Basides 18–22 × 5–6 $\mu$, à 4 stérigmates, subclaviformes. Arête des lamelles stérile par des cellules marginales subclaviformes de 16–28 × 7–10,8 $\mu$.

Dans un bois d'épicéa entre Lougres et Longevelle (Doubs, France); le 10 août et le 7 septembre 1956, leg. *G. Becker* (L).

Je crois faire oeuvre utile en donnant une description d'*Agaricus xantholepis* qui ne fut récolté qu'une seule fois en peu d'exemplaires par son auteur. Je n'en connais pas d'autres descriptions. *Agaricus xantholepis* se distingue des autres petites espèces du même genre par le revêtement du chapeau, jaune sans trace de rouge ou de lilas et rompu de bonne heure en écailles apprimées et par le pied à bulbe submarginé.

Le 10 août 1956 M. Becker en récolta trois exemplaires, de taille médiocre, qui suffirent à la détermination. Un mois plus tard le champignon poussait au même

endroit en telle quantité qu'il y fut récolté par les gens du pays pour la consommation.

Dans sa diagnose Møller use du terme déroutant «argillaceous» pour indiquer la couleur du chapeau. Par la suite il ajoute cependant entre parenthèses « aniline yellow » ou « primuline yellow ». Puis, ses figures coloriées ne laissent aucun doute sur la vraie couleur du chapeau. Rappelons que pour Josserand (Descr. Champ. sup. 165. 1952) le vocable argilacé (= couleur d'argile) dénote « des teintes neutres, sales, terreuses »; pour Snell & Dick (Gloss. Mycol. 12. 1957) « argillaceous = clay coloured = ochraceous-cinnamon-brown ».

**Agaricus arenophilus** Huijsm., *nom. nov.*—Fig. 6

*Psalliota arenicola* Wakef. & Pears. *in* Trans. Brit. mycol. Soc. **29**: 205. 1946 (basionym). — *Agaricus arenicola* (Wakef. & Pears.) Pilát, Klíč 401. 1951 (« *arenicolus* »); non *Agaricus arenicola* Fr., Hym. eur. 159. 1874.

Le voile ascendent du pied, ainsi que les spores subsphériques indiquées dans la diagnose (« sporae . . . late ellipsoideae vel subglobosae 5–6 × 4,5 μ ») situent *Agaricus arenophilus* dans le voisinage de *A. bitorquis* (Quél.) Sacc. [= *A. edulis* (Vitt.) Møll. & Schaeff., 1938, nec *A. edulis* Bull. per St. Amans, 1821]. Les figures de Pearson (*apud* Møller *in* Friesia **4**: 199. 1952) donnent une idée excellente de l'aspect général de l'espèce. Par contre, les figures des spores sont médiocres. Les spores figurées ici proviennent d'une récolte du 11 novembre 1957, effectuée dans les dunes maritimes hollandaises au sud de Noordwijk. Ainsi que les mesures trouvées par Møller (l.c.: 200) elles sont un peu supérieures (5,7–7 × 5–5,7 μ) à celles que donnent Wakefield & Pearson.

L'examen ultérieur des spores de l'exemplaire type, dont Dr. R. W. G. Dennis a eu l'amabilité de m'envoyer un fragment, donne 6,4–7...(7,8) × 5–5,7...(6,4) μ.

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# OBSERVATIONS SUR LES LEPIOTEAE FAYOD

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(Avec 12 figures dans le texte)

Descriptions et figures de *Lepiota cortinarius* J. Lange et de deux espèces nouvelles de la section *Micaceae* du genre *Lepiota*.

Le 16 septembre 1956 M. G. Becker me confia un exemplaire en parfait état de *Lepiota cortinarius* J. Lange, trouvé par un récolteur inconnu.

La publication de cette trouvaille me semble justifiée par l'extrême rareté de *L. cortinarius* en Europe, retrouvé cependant dans l'Amérique du Nord et décrit pour le Michigan par Helen V. Smith (*in* Lloydia **17**: 316. 1954).

## Lepiota cortinarius J. Lange.—Figs. 1–3

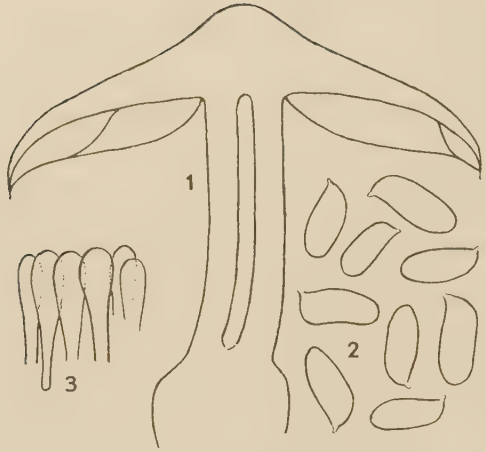
*Lepiota cortinarius* J. Lange *in* Dansk bot. Ark. **2** (3): 25, pl. 1 fig. b. 1915; Fl. agar. dan. **1**: 29, pl. 10 fig. B. 1935.

Chapeau 64 mm, campanulé-convexe, largement bossu, obtus, charnu; revêtement du disque uni, feutré-tomenteux, brunâtre-alutacé terne, ailleurs rompu en petites mèches apprimées, fibrillo-tomenteuses et se détachant en brun-alutacé sale sur un fond pâle, lavé de la même teinte; marge incurvée, nettement appendiculée. Lames serrées, avec des lamellules de trois longueurs, libres, blanc-crème, à arête serrulée. Pied 48 × 9 mm, à bulbe sphérique-aplati submarginé d'une largeur de 20 mm, tubuleux, blanchâtre, avec des fibrilles éparses dans la moitié supérieure, se réunissant en un fibrillum lâche et subalutacé au dessus du bulbe. Chair blanche, ferme; odeur faible, complexe, rappelant celle de *Cortinarius variicolor* avec un accent de *Lepiota cristata*. Spores 6,4–7,8 × 2,7–3,4 $\mu$, subcylindriques, à base généralement tronquée, à apicule sublatéral, à face abaxiale souvent faiblement concave. Basides tétrasporiques, 21–28 × 7–9 $\mu$, subclaviformes. Cellules marginales claviformes ou subclaviformes, 22–39 × 7–9 $\mu$, formant une marge stérile. Epicutis à poils longs et obtus, 180–800 × 9–20 $\mu$, rarement septés, à pigment de membrane brun, atténués-pédonculés vers leurs bases qui émergent d'un enchevêtrement d'hyphes bouclées, étroites, d'un diamètre d'environ 5 $\mu$; éléments basidiiformes non observés à la base des poils.

Un seul individu, sous les sapins, au col de Ferrière, près de Clerval (Doubs, France); le 16 septembre 1956 (L).

*Lepiota cortinarius* n'est pas à méconnaître. Dans les *Stenosporae* il fait cavalier seul par sa taille, les faibles vestiges du voile sur le pied et son bulbe sphérique-aplati. D'après la description de Helen V. Smith (l.c.) les spécimens américains s'écartent de ceux de l'Europe par les spores un peu plus grandes (7–10 × 3–4 $\mu$) et les poils du revêtement du chapeau moins allongés.

* Associé honoraire « Rijksherbarium », Leyde.




Figs. 1–3. *Lepiota cortinarius* J. Lange: 1—section × 1; 2—spores × 1540; 3—cellules stériles de l'arête des lamelles × 375.

**Lepiota sororia** Huijsm., *spec. nov.*—Figs. 5–7

*Lepiotae sistratae* peraffinis, differt statura majore, pileo stipiteque magis pulverulentis, lamellis et apice stipitis subcitrinis, sporis cylindricis, 4.8–5.7 × 2.2–2.7 $\mu$, apiculo sublaterali. Numerosus in piceto. Typus in Herb. Lugd. Bat. (L 959.167–177).

Chapeau 12–30 mm, hémisphérique-convexe ou hémisphérique-campanulé, puis convexe ou obtusément conique, à la fin parfois aux bords relevés, à peine omboné, poudré-pulvérulent par une couche granuleuse, friable et labile, excédente dans la jeunesse, blanc, lavé de beige-rosé très pâle par le froissement ou avec l'âge. Lames serrées, lamelles 35–40, lamellules de deux longueurs, libres, non écartées du pied, jaune-citrin pâle, piquetées-tachetées dans la viellesse de brun rougeâtre ou de rouge violacé, surtout à l'arête qui est entière. Pied 30–70 × 1–3 mm, grêle, subflexueux, fistuleux, en général faiblement mais progressivement atténué de haut en bas, à base souvent légèrement épaissie, d'abord recouvert de la farine blanche du voile jusqu'à une zone annulaire à peu de distance du chapeau, glabrescent, à sommet jaune citrin pâle au début, devenant fauve violacé vineux à partir de la base par l'oblitération du voile pulvérulent blanc. Chair mince et blanche ou blanchâtre dans le chapeau, subconcolore au cortex dans le pied; odeur et saveur insignifiantes. Spores 4,3–5,7 × 2,2–2,7 $\mu$, cylindriques, à apicule sublatéral, à membrane faiblement jaunissant par le liquide de Melzer. Basides tétrasporiques, 16–21 × 5–6 $\mu$, subclaviformes. Cheilocystides et pleurocystides absentes. Voile général formé de sphérocystes d'un diamètre de 21—35 $\mu$, avec de rares hyphes cylindriques, bouclées, d'un diamètre d'environ 3 $\mu$.

Sous les épicéas du «Schwarzgraben», bois près d'Aneth dans le canton de Berne (Suisse); le 18 octobre 1959, leg. *H. S. C. Huijsman* (type; L 959.167–177).

Depuis la mi-octobre jusqu'à la mi-décembre 1959 *Lepiota sororia* poussait en grande abondance sous les épicéas du «Schwarzgraben», généralement en la compagnie de *Clitocybe martiorum* J. Favre et d'*Agaricus variegans* Møll. (= *Ag. neocomensis* Konr., nom. nud.).

*Lepiota sororia*, appartenant à la section *Micaceae*, ressemble beaucoup à *L. sistrata* (Fr., 1821) Quél. [= *L. seminuda* (Lasch, 1829) Kumm.] qui pousse, un peu plus

tôt, aux mêmes endroits. *Lepiota sororia* s'écarte de l'espèce commune par la taille plus grande, la farine du chapeau plus marquée, la teinte citrine des lamelles et du sommet du pied et par les spores cylindriques à apicule sublatéral. A titre de comparaison on trouve sur la planche de *L. sororia* trois spores (fig. 8) de *L. sistrata*.

On pourrait se demander si *Lepiota sororia* ne pourrait pas être le «vrai» *Agaricus sistratus* Fr. (Syst. mycol. **1**: 24. 1821). Cependant, les «lamellae candidae» de ce dernier suffisent à rejeter d'emblée cette supposition. En outre, Fries ne semble avoir connu qu'une seule espèce dont on peut lire (Monogr. **1**: 30. 1857): «Nullum jam mihi superest dubium *A. seminudum* Lasch hujus speciei [= *A. sistratus*] sistere

Figs. 4–7. *Lepiota sororia* Huijsm.: 4—carpophore × 1; 5—deux sections × 1; 6—spores × 1540; 7—revêtement du chapeau × 500.

Fig. 8. *Lepiota sistrata* (Fr.) Quél.: spores × 1540.

Figs. 9–12. *Lepiota pulverulenta* Huijsm.: 9—carpophore × 1; 10—section × 1; 11—spores × 1540; 12—revêtement du chapeau × 500.

forman minorem . . . ». Il serait par trop artificiel de penser que Fries n'aurait rencontré que *Lepiota sororia* qui s'accorde moins bien avec la diagnose de *Agaricus sistratus* que l'espèce qu'on nomme communément *Lepiota seminuda*. Malheureusement les figures de *Lepiota sistrata* de Fries (Ic. sel. Fung. **1**: pl. 15 fig. 3. 1869) sont vraiment mauvaises, ce qui a certainement conduit la plupart des auteurs à préférer le binôme *Lepiota seminuda* à *Lepiota sistrata*.

*Lepiota petasiformis* Murr., décrit de nouveau par H. V. Smith (*in* Lloydia **17**: 319. 1954), se distingue de *L. sororia* par l'odeur de farine, les lamelles blanches, la présence de cheilocystides et l'absence de boucles.

*Lepiota hetieri* Boudier et *L. adulterina* Møll. s'écartent de *L. sororia* par plusieurs caractères, notamment par une autre gamme de teintes, la présence de cheilocystides, etc.

*Lepiota hemisphaerica* Murr., *L. cristatella* (Peck) Sacc. et *L. pusillomyces* (Peck) Sacc. [= *L. seminuda* var. *pusillomyces* (Peck) H. V. Smith] ne semblent représenter que des formes de *L. sistrata*.

*Lepiota roseicinerea* Murr. a les spores plus grandes.

*Lepiota noscitata* (Britz.) Sacc. a le chapeau glabre et les lamelles blanches et espacées.

**Lepiota pulverulenta** Huijsm., *spec. nov.*—Figs. 9–12

Pileo 25–50 mm, campanulato-convexo, umbonato, floccis pulverulentis albis dense obtecto, senectute vel tactu leviter sordide roseo. Lamellis confertis, liberis, albis vel cremeis. Stipite 40–60 × 2–5 mm, tubuloso, floccis veli dense peronato, albo vel sordide roseo. Carne vulnerata leviter rosea; odore et sapore nullo. Sporis 4.7–5.7 × 2.2–3 $\mu$, subcylindricis, apiculo sublaterali. Basidiis tetrasterigmatibus. Cystidiis vel cellulis marginalibus lamellarum destitutis. Hyphis vestimenti floccosi pilei stipitisque praecipue e cellulis oblongis vel subelongatis, angulis rotundatis, laxe cohaerentibus, latitudine 9–15 $\mu$, constitutis. Fibulis nullis.

In loco herboso prope fossam. Typus in Herb. Lugd. Bat. (L 959.167–580).

Chapeau 25–50 mm, distinct du pied, campanulé-convexe, mamelonné, recouvert en couche dense de flocons crémeux-poudreux, très friables et labiles, les plus gros dans la région discale ou péridiscale, à marge appendiculée par la floccosité, blanc, se maculant par le froissement ou avec l'âge d'un gris-rosâtre-isabelle pâle par une coloration des flocons et de la couche sous-jacente, apparaissant par places. Lames assez serrées, lamelles écartées du pied d'un demi-millimètre, lamellules de deux longueurs, blanches ou crème. Pied 40–60 × 2–5 mm, égal, tubuleux, recouvert de flocons poudreux et évanescents, jusqu'à une zone annulaire à 6–10 mm du chapeau, à sommet glabre, blanc, se colorant comme le chapeau, devenant plutôt brun-rosé à la base. Chair fragile, blanche, rosissant faiblement par le froissement ou par l'âge, surtout dans la partie centrale du chapeau; odeur et saveur nulles. Spores 4,7–5,7 × 2,2–3 $\mu$, subcylindriques, parfois un peu cambrées, à base souvent tronquée, à apicule sublatéral ou presque en éperon, faiblement pseudo-amyloïdes. Basides tétrasporiques, 18–26 × 5,5–7 $\mu$, subclaviformes. Cystides ou cellules marginales absentes. Floccosité du chapeau et du pied formée par des hyphes d'une largeur de 9–15 $\mu$, se désagrégeant à la moindre pression en articles, arrondis aux extrémités, subcylindriques-enflés ou pourvus de boursouflures, avec des hyphes éparses purement cylindriques, non rétrécies aux cloisons et d'un

diamètre de 2-5 $\mu$. Boucles ni observées aux hyphes minces des flocons, ni à celles du pied, ni à la base des basides.

Un petit groupe dans l'herbe près d'un fossé, bois du « Schwarzgraben », près d'Aneth, Canton de Berne (Suisse); le 14 octobre 1959, leg. *H. S. C. Huijsman* (type; L 955.167-580).

Depuis la mi-octobre 1959 jusqu'au début de novembre *Lepiota pulverulenta* fut retrouvé en petit nombre au voisinage de la localité-type.

Une tentative de détermination de *Lepiota pulverulenta* avec la Flore analytique de Kühner & Romagnesi (1953) mène à d'étranges difficultés. C'est sans peine qu'on arrive à « F(2) » page 396: « voile général *non* à base de cellules vraiment sphériques », s'opposant à « E(1) » ... « voile à base de sphérocystes typiques ». Se trouvent subordonnés à « E(2) »: *Lepiota rosea* Rea sensu Locq. et *L. hetieriana* Locq. (= *L. hetieri* Boud. sensu J. Lange). Or, les descriptions et les figures de Rea (*in* Trans. Brit. mycol. Soc. **6**: 61, pl. 2 fig. 1. 1918) ainsi que celles de Lange (Fl. agar. dan. **1**: 35, pl. 14 fig. J. 1935), mettent en évidence, sans l'ombre d'un doute, que l'une et l'autre de ces deux espèces ont les cellules du revêtement piléique exactement sphériques. Quant au *Lepiota hetieri* sensu J. Lange = *L. adulterina* Møll. (*L. hetieriana* Locq. étant resté à l'état de nomen nudum), on en trouvera tous les détails dans un article de Møller (*in* Friesia **6**: 20. 1959).

*Lepiota pulverulenta*, appartenant à la section *Micaceae* Lange, à revêtement piléique cellulaire, se distingue des autres espèces de ce groupe par la combinaison des caractères suivants: présence d'une épaisse pulvérulence blanche au chapeau, se désagrégeant au moindre frottement, constituée de cellules non-sphériques, manque de pleuro- et de cheilocystides et absence de boucles.

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# MYCENA MISERIOR HUIJSM., SPEC. NOV. ET MYCENA PSEUDO-PICTA (J. LANGE) KÜHN.

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(Avec 9 figures dans le texte)

*Mycena misera* (Fr.) sensu A. H. Smith est rebaptisé et traité en espèce nouvelle sous le nom nouveau *M. miserior* Huijsm. Descriptions et figures de *M. miserior* et de *M. pseudo-picta* (J. Lange) Kühn., suivies de discussions.

*Agaricus miser* Fr. a été interprété des façons les plus diverses; voir à ce sujet J. Favre (Assoc. fong. Hauts-marais jurass. 87. 1948). Afin de sortir de la confusion qui règne autour de ce nom, il me semble logique d'admettre l'interprétation de Lundell (*in* Lundell & Nannfeldt, Fungi exs. suec. Fasc. 3–4: 4. 1935), mycologue éminent qui a le grand avantage de pouvoir herboriser aux localités-type de Fries. Or, Lundell affirme que le champignon qu'il appelle *Collybia miser* convient parfaitement avec la description d'*Agaricus miser* de Fries qu'il dit être excellente. Toujours selon Lundell les figures de Fries (Ic. sel. Fung. **1**: pl. 70 fig. 3. 1873) sont cependant trop brunes et représentent des spécimens exceptionnellement grands. L'exsiccatum de Lundell & Nannfeldt (nr. 108) étant un *Lyophyllum* (Singer *in* Ann. mycol., Berl. **41**: 96 & 104. 1943), il s'ensuit qu'il est nécessaire de rebaptiser *Mycena misera* (Fr.) A. H. Smith sensu A. H. Smith (North Amer. Spec. *Mycena* 369. 1947).

*Mycena misera* sensu Smith, rare espèce de l'Amérique du Nord, se rapproche beaucoup de *M. pseudo-picta* (Lange) Kühn., pas moins rare que l'autre, et connu jusqu'ici seulement de l'Europe. Aussi, n'y a-t-il rien d'étonnant à ce que Smith, n'ayant récolté que son *Mycena misera*, ait mis en synonymie *Mycena pseudo-picta* avec un point d'interrogation. Il est vrai que *Mycena misera* sensu Smith a les lamelles seulement adnées et l'autre les a franchement décurrentes, mais on est bien autorisé à douter de la valeur taxinomique de cette différence, vu le fait que le mode de l'attachement des lamelles est susceptible de varier dans de larges limites pour certains *Mycena* (par ex. pour *M. flos-nivium*).

Contrairement à Smith, Kühner n'a trouvé que *Mycena pseudo-picta* (une seule fois en deux exemplaires). Quant à *Mycena misera* sensu Smith, Kühner (Genre *Mycena* 374. 1938) se demande, à juste raison, si celui-ci ne serait pas identique à *M. concolor* (J. Lange) Kühn., dont il (Kühner) a vu des spécimens d'herbier de J. Favre. De fait, quelques années plus tard, Smith (l.c.: 372) confirme que

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*M. concolor*, retrouvé par lui dans l'Amérique du Nord, « is very close to *M. misera* sensu Smith», tout en conservant l'un et l'autre.

Je vais essayer maintenant de dénouer le noeud gordien.

**Mycena miserior** Huijsm., *spec. nov.*—Figs. 1–5

NOMS MAL APPLIQUÉS.—*Agaricus miser* Fr. (*in* Öfvers. K. svenska VetAkad. Förh. **18**: 21. 1861) *sensu* A. H. Smith *in* Pap. Mich. Acad. Sci. **19**: 207. 1934 (*Collybia*); *Mycena misera* (Fr.) A. H. Smith, N. Amer. Spec. *Mycena* 369, fig. 43, no. 7–8 & pl. 87c. 1947.

Pileo 6–10 mm lato, convexo, subviscidulo, hygrophani, udo ad marginem striato, sordide brunneo, pallescente. Lamellis haud confertis, subventricosis, ascendentibus, adnatis vel sinuato-adnatis, pileo pallidiore. Stipite 16–20 × 1.2 mm, tenaci, sicco, griseolo-brunneo. Carne subinodora. Sporis 7.8–10.8 × 5–6.4 $\mu$, ellipsoideis, amyloideis. Basidiis tetrasterigmatibus. Cheilocystidiis inclusis, late claviformibus, diverticulis digitaliformibus prominentibus obsitis.

Planitie graminoso arido in dunis maritimis. Typus in Herb. Lugd. Bat. (L 959.167–090).

Carpophores recouverts de grains de sable qui adhèrent surtout au chapeau. Chapeau 6–10 mm, hémisphérique, puis convexe ou conico-convexe, strié jusqu'au tiers du rayon, à peine viscidule quand humide, brun bistre très foncé (plus saturé que L. f6), gris-brun ocracé vers la marge crénelée, plus pâle par le sec. Lames peu serrées, lamelles ± 22, alternant avec les lamellules, parfois bifurquées, subventrues, ascendentes, adnées ou sinuées-adnées, brun gisâtre, à arête subentière, un peu plus pâle que les faces. Pied 16–20 × 1,2 mm, subégal, raide et dur, sec, glabre, gris brunâtre sale (près de L. h4), un peu plus foncé vers la base subtomenteuse qui est attachée à des débris de Graminées. Chair mince dans le chapeau, subconcolore; odeur insignifiante. Spores 7,8–10,8 × 5–6 $\mu$, ellipsoïdes, amyloïdes. Basides à 4 (2) stérigmates, 26–35 × 10–12 $\mu$, claviformes. Cheilocystides en massue, incluses, à prolongements digitiformes subramifiés saillants qui peuvent atteindre une longueur de 25 $\mu$. Pleurocystides absentes. Trame des lamelles subrégulière, pseudoamyloïde ainsi que la trame du chapeau. Epicutis à hyphes filiformes en brosse fine, écartées les unes des autres. Hypoderme à hyphes de 12–30 $\mu$ de large, composées d'articles assez allongés. Pied sur coupe transverse à cortex épais, collenchymateux, à 7 ou 8 couches de cellules à lumière étroite (par exemple d'un diamètre d'environ 2 $\mu$) passant insensiblement, vers l'axe du pied, à des hyphes à lumière plus ample.

Quatre exemplaires sur des débris de Graminées d'un terrain sec et aride (parc pour voitures, abandonné en automne), dans les dunes maritimes de Meijendel, commune de Wassenaar, près de la Haye, province de Zuid-Holland (Pays-Bas); le 6 novembre 1957, leg. *H. S. C. Huijsman* (type; L 959.167–090).

A part des lamelles, semblant encore moins largement adnées chez les spécimens hollandais que chez ceux de l'Amérique du Nord, les premiers répondent parfaitement à la description (l.c.), aux figures et à la photographie de A. H. Smith. C'est seulement l'habitat des individus hollandais qui semble un peu aberrant. La première récolte de Smith (1934: 207) fut effectuée « on hummocks in a larch swamp » (sur des tourons dans un marais à mélèzes). Cela n'implique pas forcément que le substratum ait été très mouillé. D'ailleurs, dans sa monographie (1947: 370), Smith ne fait mention que de « gregarious on humus ».

Impossible de confondre *Mycena miserior* avec *M. concolor* (J. Lange) Kühn., tel que cette espèce a été décrite par son auteur [*in* Dansk bot. Ark. **6** (5): 15. 1930 ut *Omphalia picta* var. *concolor*] et surtout par J. Favre apud Kühner (1938: 372) et qui a un habitat différent. En Hollande, aussi bien que dans les tourbières jurassiennes, *Mycena concolor* préfère les sphaignes. Puis, par les lamelles adnées-décurrentes, pourvues d'une large dent, il a l'aspect incontestablement omphalioïde, et enfin, les spores (mensurations personnelles: 7,8–10,7 × 3,6–5 $\mu$) en sont plutôt subcylindriques ou même cylindriques, exactement comme celles qui ont été figurées par le regretté mycologue de Genève.

D'après les descriptions et les figures de Smith, on ne peut se soustraire à l'impression que la lacune qui sépare *Mycena miserior* de *M. concolor* est moins large dans l'Amérique du Nord qu'en Europe. Les spécimens hollandais de *Mycena concolor* ne différant en rien de ceux de Favre, j'ai malheureusement omis d'en prendre une description.

Figs. 1–5. *Mycena miserior* Huijsm.: 1—carpophore × 1,5; 2—deux sections × 1,5; 3—spores × 1540; 4—baside × 500; 5—cheilocystides × 500.

Figs. 6–9. *Mycena pseudo-picta* (J. Lange) Kühn.: 6—trois sections × 1,5; 7—spores × 1540; 8—baside × 500; 9—cheilocystides × 500.

MYCENA PSEUDO-PICTA (J. Lange) Kühn.—Figs. 6–9

*Omphalia pseudo-picta* J. Lange *in* Dansk bot. Ark. **6** (5): 15, pl. 1 fig. 12a, b & pl. 2 fig. 23. 1930. — *Mycena pseudo-picta* (J. Lange) Kühn., Genre *Mycena* 363, fig. 114–116. 1938.

Chapeau 8—10 mm, convexe ou convexe papillé, puis déprimé tout en conservant la papille, parfois ombiliqué de bonne heure et dépourvu de papille, à revêtement d'aspect un peu gras, luisant, sec, strié par transparance jusqu'à la moitié du rayon, à zone péridiscale gris brun, plus pâle dans les interstries et généralement au disque, pâlissant par le sec, à marginelle crénelée-subdenticulée, blanchâtre. Lames peu serrées, lamelles 20–22, avec des lamellules de une ou deux longueurs, arquées-décurrentes, interveinées, gris souris. Pied 25–35 × 1 mm, égal, fistuleux, sec, strigueux-cotonneux à la base, argenté-brillant, pruineux-farineux au sommet, grisâtre ou gris-brunâtre peu foncé. Chair mince dans le chapeau, sauf au centre, subconcolore, inodore. Spores 8...10–12 × 4,7–6 $\mu$, cylindracées ou cylindracées-obovales, parfois cambrées, amyloïdes. Basides 29–40... (47) × 7–9 $\mu$, à deux stérigmates saillants. Cheilocystides incluses, à pédicule subcylindrique atteignant une longueur d'environ 25 $\mu$ et s'évasant lentement vers le sommet qui est couronné de proéminences, souvent branchues, saillantes, ne dépassant pas la longueur du pédicule. Pleurocystides absentes. Trame des lamelles subrégulière, pseudo-amyloïde ainsi que la trame du chapeau. Epicutis mince, subgélifié, à hyphes filiformes en brosse, avec ça et là des ramifications buissonnantes. Hypoderme à hyphes d'un diamètre de 18–36 $\mu$, constituées d'éléments subcelluleux, arrondis aux extrémités, au quotient longueur/largeur = 1 à 3. Pied sur coupe transverse à cortex mince, collenchymateux, à 3 ou 4 couches d'hyphes à lumière étroite, passant assez abruptement aux hyphes de la chair à lumière ample.

Plusieurs individus, soit subcespiteux, soit isolés, sur une pelouse moussue, enlaçant les radicelles des Graminées d'un coton blanc; à Marin (Canton de Neuchâtel, Suisse), le 7 novembre 1959, leg. *H. S. C. Huijsman* (L).

Il est remarquable que toutes les récoltes de *Mycena pseudo-picta* figurant dans la littérature, savoir celles de Lange, de Kühner et de R. Maire apud Kühner (l.c.), ont les basides bistérigmatiques. Il faudrait du matériel de plus de localités pour savoir si ce caractère est absolument constant. Il est peut-être d'une certaine importance de relever que toutes les récoltes proviennent de pelouses et surtout qu'elles se ressemblent en détail d'après les descriptions et les figures des auteurs cités. *M. pseudo-picta* paraît être une espèce peu variable ce qui fait penser à une constance possible de la bisporie.

*Mycena pseudo-picta* se distingue de *M. miserior* par la couleur plus grise et moins brune, par la forme générale du chapeau plus étalée, par les lamelles franchement décurrentes et par les basides bisporiques et les spores plus cylindriques. Puis *Mycena pseudo-picta* a les cheilocystides à corps subcylindrique ou faiblement claviforme, orné de prolongements nettement ramifiés et contorsionnés, tandis que le corps des cheilocystides de *M. miserior* (aussi bien dans la forme américaine que dans la forme européenne) est en massue et porte des prolongements moins ramifiés et plus digitiformes. Finalement, le pied de *M. pseudo-picta* a un cortex mince bien individualisé, tandis que le pied collybioïde, dur et tenace, de *M. miserior* a un cortex relativement épais qui passe insensiblement à la chair pédiculaire.

*Mycena pseudo-picta* se distingue de *M. concolor*, sur lequel j'espère revenir, par l'habitat, les lamelles plus décurrentes, la forme fondamentale des cheilocystides, subcylindriques chez le premier, piriformes chez l'autre, et caetera.

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# OBSERVATIONS SUR LE GENRE RIPARTITES

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*Cernier, Ne., Suisse*

(Avec 5 figures dans le texte)

Descriptions et figures de *Ripartites helomorphus* (Fr.) P. Karst. et de *R. metrodii* Huijsm., spec. nov. = *R. tricholoma* var. *helomorphus* (Fr.) Métr. sensu Métr., suivies de discussions.

Malgré l'excellent travail de Métrod (*in* Rev. Mycol., Paris **11**: 74. 1939), le genre *Ripartites*, représenté, peut-être, par une demi-douzaine d'espèces dans l'Europe Centrale, reste encore à débrouiller.

Jusqu'à présent on s'est basé presque exclusivement sur les caractères d'ordre physionomique et organoleptique pour distinguer entre-elles les espèces de ce genre fort homogène. Par contre, on n'a pas encore tiré profit de ceux qu'offre l'ornementation des spores, du fait de leur exiguïté qui s'oppose à un examen consciencieux. En interposant cependant un filtre vert entre la source lumineuse et le condensateur du microscope, après coloration de la préparation au rouge Congo ammoniacal, on peut mieux étudier les détails de l'ornementation.

## Ripartites helomorphus (Fr.) P. Karst.—Figs. 1–2

*Agaricus helomorphus* Fr., Epicr. 184. 1838. — *Flammula helomorpha* (Fr.) Quél. *in* Mém. Soc. Emul. Montbél., 2e sér., **5**: 129. 1872. — *Ripartites helomorphus* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **32**: 479. 1879. — *Paxillus helomorphus* (Fr.) Quél., Enchir. Fung. 92. 1886. — *Paxillus tricholoma* ssp. *helomorphus* (Fr.) Quél., Fl. mycol. 110. 1888. — *Ripartites tricholoma* f. *helomorphus* (Fr.) Konr. & Maubl., Ic. sel. Fung. **6**: 129. 1929 (« *helomorpha* »). — *Paxillopsis helomorpha* (Fr.) J. Lange *in* Dansk bot. Ark. **9** (6): 57. 1938 (« *helomorphus* », non valablement publié). — *Paxillopsis helomorpha* (Fr.) J. Lange, Fl. agar. dan. **4**: 49. 1939 (publication valable).

Nom mal appliqué.—*Ripartites tricholoma* var. *helomorphus* (Fr.) Métr. *in* Rev. Mycol., Paris **11**: 74. 1946 (« *helomorpha* »).

Chapeau 25—55 mm, charnu, subplan, gibbeux au centre, puis faiblement déprimé à bosse restant évidente bien que peu élevée, costulé vers la marge, à bord enroulé-incurvé à cannelures serrées, dépourvu de cils, à revêtement feutré-glacé, alutacé-isabelle pâle, plus foncé au centre, parfois faiblement zoné-ridé à mi-rayon. Lames très serrées, lamelles intercalées de lamellules de plusieurs longueurs, minces, étroites, beige-alutacé sale. Pied 23–32 × 3–5 mm, plein, atténué vers la base qui peut être légèrement épaissie, glabre, poli, sauf au sommet qui est villeux-subsquamuleux, blanchâtre sale, plus grisâtre vers la base. Chair épaisse dans le chapeau, surtout au centre, isabelle très pâle, à ligne cornée hyaline au dos des lamelles; odeur faible de farine, peu agréable, saveur amarescente, même un peu

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âcre après mastication prolongée. Spores largement ellipsoïdes, 3,8–4,8 × 2,9–3,6 $\mu$, ornées de basses verrues arrondies d'une hauteur de 0,2–0,3 $\mu$, à plage supraapiculaire lisse. Basides 25–34 × 5–7,5 $\mu$, à 4 stérigmates, progressivement atténuées vers leur base bouclée. Cystides absentes. Trame des lamelles subrégulière, au moins dans la jeunesse. Epicutis mince, à hyphes cylindriques entrecroisées de 3–6 $\mu$ de large. Hypoderme très aérifère à hyphes cylindriques d'une largeur d'au moins 6 $\mu$, emmêlées-ascendentes et passant insensiblement à celles de la trame piléique. Boucles non observées aux hyphes de l'épicutis, sporadiquement aux hyphes corticales du pied.

Trois exemplaires sur un sentier dans une pessière près du Lac Génin, Oyonnax (Ain, France); le 7 octobre 1957, leg. *H. S. C. Huijsman* (L).

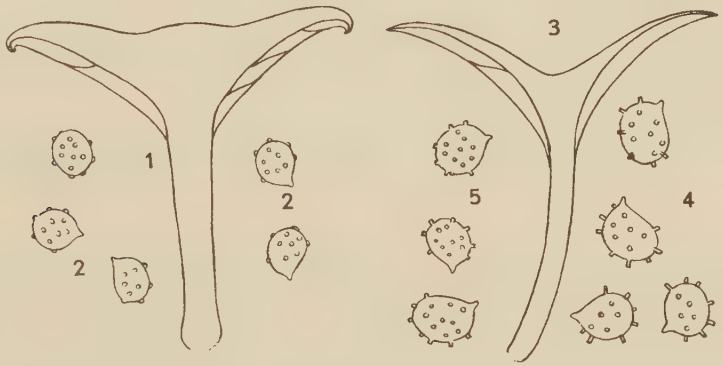
Est-ce que l'espèce décrite ci-dessus est bien l'*Agaricus helomorphus* Fr.? Probablement ne le saura-t-on jamais en toute certitude, mais en même temps il serait très difficile, sinon impossible, d'en exclure la possibilité. L'espèce de Fries, « aux spores plus pâles que les autres *Flammula* » a en commun un bon nombre de caractères avec l'espèce de l'Ain. J'attire seulement l'attention sur le chapeau charnu, gibbeux, à marge dépourvue de cils et sur le pied glabre, s'atténuant un peu vers la base. Certaines discordances donnent l'impression d'être plutôt apparentes que réelles. Ainsi, les spécimens français, cueillis par un temps sec, n'avaient pas le chapeau «viscidus», et le diamètre piléique du plus grand exemplaire (fig. 1) dépassait de beaucoup la limite supérieure de 25 mm indiquée par Fries. Ce qui est cependant plus grave c'est que la couleur du chapeau de l'*Agaricus helomorphus* Fr. est dit «albus» par son auteur.

Quoi qu'il en soit, l'espèce indiquée par Ricken (Blätt. Pilze 97, pl. 28 fig. 6. 1911) sous le même épithète spécifique, ainsi que le *Ripartites helomorphus* de Kühner & Romagnesi (Fl. an. 175. 1953) et très probablement aussi celui de Singer (*in* Lilloa **22**: 590. 1951) avec le chapeau «somewhat umbonate in the center» sont à considérer comme identique à l'espèce décrite. Peut-être est-ce aussi le « *helomorphus* » de certains autres auteurs, notamment celui de Rea (Brit. Basid. 323. 1922), de Bresadola (Icon. mycol. **16**: pl. 787. 1931) et de J. Lange (l.c.). Seulement on connaît trop mal la variabilité de l'espèce en question pour en dire plus long. Par contre, on peut bien dire que ce n'est pas le *Ripartites tricholoma* var. *helomorphus* (Fr.) Métr. sensu Métr. (l.c.), qui a la chair mince et le chapeau simplement déprimé ou subinfundibuliforme, ce qui est contraire à la diagnose de Fries, et qui, en outre, a les spores plus grandes, ni le *Ripartites helomorphus* sensu Moser (Kl. Krypt. Fl. **2b**: 148. 1955), qui a les mêmes mesures sporiques que la variété de Métrod.

Pour *Ripartites helomorphus* sensu Ricken, Kühner et Romagnesi (l.c.: note 10) font remarquer qu' « il est peu probable qu'il s'agisse de l'espèce friésienne, non seulement parce que Fries ne signale pas d'odeur, mais surtout parce qu'après avoir décrit *helomorphus* et *tricholoma* côte à côte (Monographia), Fries les a séparés (Hym. europ.) dans des genres différents, laissant *helomorphus* dans les *Flammula*, à côté de *scambus*, et transférant *tricholoma* dans les *Inocybe*, ce qui laisse supposer qu'*helomorphus* n'est pas une espèce de l'affinité de *tricholoma* ». L'argumentation des grands mycologues français ne me semble pas convaincante. L'erreur de Fries

était de voir, vers la fin de ses jours, un *Inocybe* dans l'*Agaricus tricholoma*. En même temps, il n'avait plus d'idée claire de l'*Agaricus helomorphus*. On arrive à cette dernière conclusion en comparant attentivement la diagnose du grand Suédois et la description dans Monogr. **1**: 349. 1857 avec la description et surtout avec les figures dans Icon. sel. Fung. **2**: 19, pl. 120 fig. 4. 1878. L'espèce figurée au chapeau convexe dépourvu de bosse, à la chair mince et aux lamelles ocracées à peine subdécurrentes (quelque *Cortinarius* du groupe *cristallinus*?), n'est plus la même que celle d'Epicrisis. Fries a bien senti cela en écrivant: « Tab. 120 f. 4 praebet *A. helomorphi* varietatem gracilescentem, notis minoris momenti a typo recedentem ».

Aussi, ne semble-t-il pas improbable que Fries (Hym. eur. 252. 1874) ne sachant que faire de l'*Agaricus* (*Flammula*) *helomorphus*, ait laissé, tout simplement, cette espéce à côté de l'*A.* (*Flammula*) *scambus*, la séparant ainsi de l'*A.* (devenu *Inocybe*) *tricholoma*.




Figs. 1–2. *Ripartites helomorphus* (Fr.) P. Karst.: 1—section × 1; 2—spores × 1540.

Figs. 3–4. *Ripartites metrodii* Huijsm.: 3—section × 1; 4—spores × 1540.

Fig. 5. *Ripartites tricholoma* (Alb. & Schw. per Fr.) P. Karst.: spores × 1540.

*Ripartites helomorphus* se distingue de ses congénères par le chapeau gibbeux et charnu, beaucoup plus épais que la largeur des lamelles, par l'absence de cils marginaux et par ses spores très petites à verrues basses et arrondies.

**Ripartites metrodii** Huijsm., *spec. nov.*—Figs. 3–4

*Ripartites tricholoma* var. *helomorphus* (Fr.) Métr. *sensu* Métr. *in* Rev. Mycol., Paris **11**: 74. 1946 (« *helomorpha* »).

Pileo 15—45 mm lato, primum plano-convexo, vix subumbonato, mox depresso vel infundibuliformi, albido; margine involuto, ciliis destituto. Lamellis confertissimis, decurrentibus, albidis vel griseolis. Stipite 30–40 × 2.5–4.5 mm, albido, deorsum pallide brunneo-incarnato. Carne pilei tenui; odore subnullo. Pulvere sporarum alutaceo-griseo. Sporis 5–6.4 × 4–4.8 $\mu$, globoso-ellipsoideis, aculeis relative longis ornatis. Basidiis tetrasterigmatibus. Cystidiis destitutis. Hyphis fibuligeris.

Gregarius, in picetis vel silvis mixtis. Typus in Herb. Lugd. Bat. (L 955.167–580).

Chapeau 15–45 mm, plan-convexe, à peine bossu au centre au début, déprimé de bonne heure, devenant infundibuliforme, subvisqueux, à marge involutée subpubescente, dépourvue de cils; revêtement blanc, feutré-satiné ou presque micacé-brillant dans la jeunesse, puis ternissant et blanc-crème ou lavé de jaunâtre au disque, souvent diffracté et tesselé-rivuleux chez les vieux exemplaires, laissant apparaître alors la chair, beige par l'humidité, concolore par le sec, parfois zoné-ondulé et costulé vers la marge. Lames très serrées, 20–25 sur 10 mm de la circonférence, lamellules de trois ou quatre longueurs, minces, étroites, arquées-subdécurrentes, beige très pâle, puis café-au-lait à reflet rosé. Pied 30–40 × 2,5–4,5 mm, plein, courbé-ascendent, parfois bosselé, subégal, furfuracé au sommet, à base subtomenteuse et pourvue de rhizoïdes, blanchâtre en haut, incarnat-brunâtre pâle à reflets violacés en bas. Chair mince dans le chapeau, blanche sur le sec, beige-hyaline par l'humidité, avec une ligne cornée au dos des lamelles; odeur très faible, mal définissable, saveur absente. Sporée beige-alutacé (Expo. D63). Spores 5–6,4 × 4–4,8 $\mu$, largement ellipsoïdes, à épines allongées d'une longueur de 0,4–0,7 $\mu$, à plage supraapiculaire lisse. Basides 20–24 × 5,7–7 $\mu$, tétrastérigmatiques, subclaviformes. Cheilocystides et pleurocystides absentes. Trame des lamelles subrégulière. Sous-hyménium mince, celluleux-rameux. Epicutis mince, constitué d'hyphes étroites (2,5–5,5 $\mu$), couchées, serrées, entrecroisées, bouclées. Hypoderme très aérifère, à éléments un peu plus larges que ceux de l'épicutis, emmêlés-ascendents, passant insensiblement aux hyphes de la chair piléique.

«Staatswald», bois mêlé près de Müntschlemier (450 m) Canton de Berne, (Suisse); le 17 octobre 1959 (type; L 959.167–580). Villiers (800 m) Canton de Neuchâtel, en grand nombre sous les épicéas, leg. *H. S. C. Huijsman* (L).

Métrod ayant été le premier à se rendre compte que le *Ripartites* décrit ci-dessus n'est pas simplement une forme sans valeur systématique de *R. tricholoma* et en ayant donné une description excellente et des figures, je dédie cette espèce à l'éminent mycologue de Champagnole. D'ailleurs, c'est bien avec doute que Métrod a attribué ses récoltes à l'*Agaricus helomorphus* Fr., puisque cet auteur a fait la remarque suivante: «Je lui donne le nom d'*helomorpha* bien que les descriptions de Fries et de Lange mentionnent le chapeau gibbeux, ce qui n'arrive que rarement dans les récoltes que j'ai observées».

Malgré mon expérience personnelle qui est très limitée en Suisse, j'ai l'impression que *Ripartites metrodii* y est très commun. En 1959 je l'ai vu dans les forêts du Jura, dans celles de la plaine qui entourent le lac de Neuchâtel et enfin près de Brugg, entre Bâle et Schaffhouse. La plupart des spécimens figurés par Konrad (*in* Konr. & Maubl., Icon. sel. Fung. **1**: pl. 83. 1928) sous le nom de *Ripartites tricholoma*, représentent *R. metrodii*, ainsi que le prouvent les aquarelles originales, conservées dans le Laboratoire de Botanique de l'Université de Neuchâtel. Konrad (on verra aussi *in* Bull. Soc. mycol. Fr. **63**: 154. 1927) ne distinguait qu'une seule espèce «polymorphe, très variable de ciliation, un peu de couleur et de taille . . .». Le grand mérite du mycologue de Neuchâtel était de faire revivre le genre *Ripartites* P. Karst. (*in* Bidr. Känn. Finl. Nat. Folk **32**: XXIV & 477. 1879), repris par Patouillard (Hym. Eur. 118. 1887), puis réduit, par ce même auteur, (Essai taxon. Hym. 163. 1900) en section d'*Inocybe*.

Sous le microscope les spores de *Ripartites metrodii* (fig. 4) se distinguent de celles

de *R. tricholoma* (fig. 5) par l'ornementation. Tandis que les épines sporiques de *R. tricholoma*, situées dans un plan perpendiculaire à la ligne visuelle, se dessinent en carré ou à peu près, les épines sporiques de *R. metrodii*, situées de la même façon, se montrent considérablement plus longues que larges.

Les spores des deux espèces citées, ornées d'épines tronconiques, sont différentes de celles de *R. helomorphus*, plus petites et pourvues de verrues basses et arrondies.

Sur le terrain on ne confondra pas *Ripartites metrodii* avec *R. tricholoma* qui s'en distingue par le port, la taille plus petite, la présence de cils, etc. On le prendra plus facilement pour un représentant du complexe *Clitocybe phyllophila-pithyopila*, surtout quand les lamelles sont encore pâles.

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# NOTES ON HYDNUMS

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This paper deals with a number of specific and subspecific names omitted from the previous series, "The stipitate Hydnums of the Netherlands". The new combination *Bankera mollis* (P. Karst.) Maas G. is proposed, and *Phellodon carnosus* and *Bankera carnosa* are reduced to its synonymy.

". . . sed quis omnes praesumtas opiniones pessundare audet?"—E. M. Fries, Syst. mycol. **2**: 19, note. 1822.

The parts of "The stipitate Hydnums of the Netherlands", here referred to as Part I, II, &c., were written in successive steps, and, as indicated by their title, at least originally meant to cover only the indigenous species, or at most also such species as might be expected to be found in this country. Gradually, however, I was made to realize that it was necessary to consider more and more species, whether they had or had not any relation to those found inside our political boundaries. As a result, Part IV looks very different indeed from Part I, whilst the present paper is needed to mend the shortcomings of Parts I to III.

In my attempts to account for the numerous names proposed for species of stipitate Hydnums I have been greatly assisted by information and/or loans from the Herbaria at Beltsville, Coimbra, Geneva, Helsinki, Kew, Lisbon, Moscow (Idaho; College of Forestry), Munich, Padua, Prague, Stockholm, Uppsala, Victoria (British Columbia; Forest Biology Laboratory), and Vienna. It is a pleasure to take this opportunity of once again expressing my deep appreciation. A great debt of gratitude I owe also to Dr. M. A. Donk, without whose help my work would not have been complete. I would also like to thank Mr. J. T. Palmer, Liverpool, for his help in correcting the English text of the present paper.

*a b i e t i s.* — *Hydnum abietis* Weir *ex* Hubert, Outline Forest Pathol. 305. 1931. — Type: "*Hydnum abietis* nov. spec." (BPI 9964).

After having discussed the above binomial (Part IV: 130), and on the advice of Dr. R. E. Foster, Victoria, B.C., I wrote to the National Fungus Collections, Beltsville, and the College of Forestry, Moscow, Idaho, requesting the loan of Weir's an Hubert's material.

The material received from the former institute (BPI) consisted of collections determined by Weir as *Hydnum coralloides*, *H. alpestre*, and *H. abietis*. Considering the confusion in the genus *Hericium*, it may be of interest briefly to report on these collections. Under the name of *H. coralloides*, Nos. 3598, 3599, 3600, 3601, and 11209 are correctly identified, but Nos. 3574, 11210, and one collection without

number are *Hericium ramosum*. What has been called *Hydnum alpestre* is *Hericium coralloides* in No. 16017, and the '*alpestre* sensu Bresadola' form of this species in No. Q305. Of *Hydnum abietis*, Nos. 9964, 16019, and 16022 are *Hericium coralloides*; No. 16020 contains, apart from the normally developed form, some specimens referable to what I have called the 'contracted form'; whilst No. 16015 is entirely this form. Number 9964 is the most outstanding collection in that it is the only one to have an additional label which reads: "*Hydnum abietis* nov. spec. on *Abies grandis* Lindl. / Priest River, Idaho. Sept. 19. 1916. Coll. and Det. by James R. Weir."

Comparing Weir's *Hydnum abietis* with his collections of *Hericium coralloides*, as well as with other specimens of that species of Canadian and European provenance, I have satisfied myself that the only difference lies in the somewhat shorter length of the spines of *H. abietis* (up to 8-9 mm), which to my mind does not provide a basis for the segregation of a new species.

The material of *Hydnum abietis* from Hubert's herbarium, borrowed from the College of Forestry at Moscow, Idaho, consists of some fragments which likewise represent nothing but *Hericium coralloides* with even shorter spines (up to 4 mm).

As far as the choice of the type of *Hydnum abietis* is concerned, the following considerations should be observed:

(i) Hubert, perhaps never intending to describe a new species, was afterwards credited with the authorship of that species, because he happened to be the first to supply a description; (ii) it is very likely that Hubert, in writing "*Hydnum* sp. (*H. abietis*)," meant to indicate that the bracketed name was the one adopted from Weir; (iii) one of the labels accompanying Weir's material is actually marked "*Hydnum abietis* nov. spec." From this it appears appropriate to designate Weir's collection (BPI 9964) as the type. It also follows that the correct author citation of *Hydnum abietis* should be, Weir ex Hubert. Summing up, it appears from the study of the said material that *Hydnum abietis* should be identified with *Hericium coralloides*, not *H. ramosum* as was my former guess.

*a c e r.* — *Phaeodon acer* (Quél.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898 ("*acris*").

An overlooked recombination which should be inserted in Part II: 56. It should also be noted that the ending in the specific epithet of *Sarcodon* "*acre*" is incorrect as it denotes the neuter form, whereas *Sarcodon* is masculine.

*a c u l e a t u s.* — *Clavaria aculeata* Blonski, Wyniki. Posz. Floryst. 17. 1890 (n.v.). — Type locality: Poland.

The description, as quoted with slight modifications from Corner (*Clavaria* 262. 1950), runs as follows:—

Very much branched, delicate, pinkish white. Branches terete, smooth, erect. Branchlets attenuate, mucronate, toothed with spines on all sides, concolorous or pinker, dense and regular. Spores white. On rotten trunks, in the mountains.

While Corner listed the present species under the dubious Clavarias, I have no doubt that *Clavaria aculeata* actually belongs to *Hericium*. Very probably even it is the '*alpestre* sensu Bresadola' form of *Hericium coralloides*.

*a d p r e s s u s*. — *Hydnum adpressum* Lloyd, Mycol. Writ. **4**: 552, fig. 757. 1916. — Type: U.S.A., Alabama, Montgomery. No. 16967 (not seen; BPI).

Coker & Beers rightly considered the present binomial synonymous with *Sarcodon imbricatus*, but it should perhaps be added that *Hydnum adpressum* represents the old stage of that species as described and illustrated by Beardslee (1924: 256).

*a f f i n i s*. — *Hydnum affine* Lloyd, Mycol. Writ. **7**: 1296. 1924 (nomen nudum); see Stevenson & Cash *in* Bull. Lloyd Libr. **35**: 67. 1936. — Type: "*Hydnum affine* / No. 16729" (BPI).

Lloyd thought his species to be near *Hydnum ferrugineum*, in other words a species of the genus now called *Hydnellum*. From the description drawn up from the type specimen, it is apparent that this is not so.

Pileus broken, largest diameter 26 mm, plano-convex, depressed in centre, surface smooth, glabrous, yellowish brown to rufous brown in places, margin involute. Stipe 20 × 5–11 mm, tapering downwards, smooth, glabrous, somewhat shining, paler than pileus above, dark brown below, with remnants of whitish felt at base. Spines decurrent, up to 3 mm long, chocolate brown. Context homogeneous, pallid in pileus (stipe not sectioned owing to scanty material available). Hyphae thin-walled, much inflated in places, without clamp connections. Spores roughly tubercular, irregular in outline, yellowish, 5.4–6.3 × 3.6–4.0 $\mu$ (warts not included). Taste neither peppery-acrid nor bitter.

From the colour of the spines, the shape of the spores, and the nature of the hyphae of the flesh it is clear that Lloyd's specimen belongs to the genus *Sarcodon*. Of the groups proposed in Part I: 46, Group 1 may be excluded on account of the pale colour of the flesh. The lack of clamp connections rules out Group 3, which leaves Groups 2 and 4 to be considered. The latter is not very likely, since the only non-scaly species of this group, *Sarcodon amarescens*, is both peppery and bitter, although it is certainly prudent to remember that this character may have disappeared on drying. But then, the stipe of *S. amarescens* is certainly not dark brown at the base. Excluding this possibility, the one group left would be Group 2, but it is at once clear that Lloyd's specimen has nothing to do with either *Sarcodon bubalinus* or *Hydnum badium* sensu Lundell. Obviously, *Hydnum affine* is not identifiable with any European species.

Keying out the specimen with Coker & Beers's work, I find that it comes nearest *Sarcodon stereosarcinon* (= *S. brevipes*), but it differs from that species in the somewhat bigger spores (the spores in our collections of *S. stereosarcinon* from Canada measure 4.0–4.5 × 2.7–3.6 $\mu$, warts not included), and the lack of the peculiar concentrical, slightly darker zones near the margin.

Whether the specimen represents an undescribed species must be left undecided for the moment.

*albus*. — *Hydnum album* Raddi *in* Mem. Mat. Fis. Soc. ital. Sci., Modena **13**: 361. 1807 (nomen nudum).

This binomial, which was enumerated by its author in a checklist, but of which no description was given, should have been mentioned in connection with *Hydnum album* Pers. ex Steud. and *H. album* Fr., see Part IV: 135.

*amarescens*. — *Phaeodon amarescens* (Quél.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

To be inserted in Part I: 47.

*aspratus*. — *Hydnum aspratum* Berk. *ex* Cooke *in* Grevillea **10**: 121. 1882. — *Phaeodon aspratus* (Berk. ex Cooke) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — *Sarcodon aspratus* (Berk. ex Cooke) S. Ito, Mycol. Fl. Japan **2** (4): 183. 1955 (n.v.; information Dr. R. Imazeki); Nikol. (publication not seen, reference *in* Z. Pilzk. **24**: 72. 1958). — Type: "Japan. *Hydnum aspratum* B." (K).

The sheet in the type folder bears two blackened halves of a specimen (the same specimen?) from M. C. Cooke's herbarium, as well as an envelope containing a whole specimen. The latter is the type. It agrees in all respects with Berkeley's description, and the handwriting (in pencil) of its label is undoubtedly Berkeley's, closely resembling the handwriting of the label of *Hydnum curtisii* which I had on loan at the same time.

Unfortunately, no spores could be found, while the collapsed and conglutinated hymenium made it impossible to count the number of sterigmata per basidium (4–5–6 in *Hydnum* and *Sistotrema*, 4 in all other stipitate species), but such secondary characters as the brown colour of the pileus and the presence of scales definitely exclude the possibility of the type being a species of either *Hydnum* or *Sistotrema*. Also, the specimen is not likely to be a *Bankera*, as the hymenium in that genus is not known to turn dark brown. The nature of the context which is made up of flexuous, inflated, and, for the most part, badly collapsed hyphae, points in the direction of *Sarcodon*, while the pale colour of the flesh in both the pileus and the stipe, combined with the presence of clamps, proves the type specimen to belong to Group 3. *Sarcodon laevigatus* which is a member of this group may be ruled out on account of the erect position of a number of the scales. While this leaves only *Sarcodon imbricatus* to be considered, it also appears that determination with the key of Coker & Beers to the North American species gives the same result.

The infundibuliform pileus with its centre rotted away to form a hole which reaches far into the stipe clearly indicates that the type specimen was collected at an advanced stage of its development (compare Beardslee, 1924). This also explains the comparatively smooth surface of the pileus, since there is an increased tendency for the scales to collapse with age, disappearing entirely or almost so. Rain may speed up this process. The initial phase to such a disintegration is well shown in the illustration of what is called *Sarcodon aspratus* by Imazeki & Hongo (Col. Ill. Fungi Japan pl. 48 fig. 273. 1957), in which most of the scales are seen to be flush

with the surface, with only a few remaining upright. The pale colour of the pileus in this illustration, and the great number of rather narrow scales are somewhat unusual, but not surprising, for I have come to regard *Sarcodon imbricatus* as a very variable species even in Europe.

Presumably, the variability is so extensive as to include also the odour. While I myself have no recollection of *S. imbricatus* giving off a particular smell on being dried, and Coker & Beers stated the species to be "at times aromatic when drying", the highest appraisal was voiced by a Japanese: "When it [*Phaeodon aspratus*] is dried it emits a sweetish aroma so strong that when a single mushroom is put in a room the air becomes impregnated with its odour" (Kawagoe, 1924: 204).

*aterrimus.* — *Hydnum aterrimum* Opiz *in* Lotos **5**: 42. 1855; not *Hydnum aterrimum* Fr., Syst. mycol. **1**: 416. 1821. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Fugau.

Since the original description is wholly insufficient for the species to be identified, the name should be rejected as a nomen dubium.

*atrospinosus.* — *Fungus atrospinosus* Paul., Traité Champ. **2**: Index. 1793 (for description, see p. 123: Savatelle-épine). — Type locality: Western France.

The plate to which Paulet refers (as *Scutiger spinosus*) gives the impression of the species being a fleshy Hydnum, while the purplish brown colour of the spines clearly point to *Sarcodon*. Although the pileus is depicted as having an ochraceous colour, it is explicitly described as "d'un roux blanchâtre". The latter colour combines with the smooth surface of the pileus and the lateral, white stipe to characterize the species as *Sarcodon laevigatus*.

*aurantius.* — *Hydnum aurantium* Rafin. *in* J. Bot. (ed. Desv.), Paris **1**: 237. 1813; Préc. Découv. Trav. somiol. 50. 1814 ("*aurantinum*"); *ex* Steudel, Nomencl. bot. **2**: 202. 1824. — Type locality: U.S.A., Delaware.

From the original description, with slight alterations repeated in 1814, it is obvious that Rafinesque had collected *Hydnum repandum* var. *repandum*.

*auratilis.* — *Hydnellum auratile* (Britz.) Maas G. *in* Persoonia **1**: 111. 1959.

Since my note on *Hydnellum auratile*, I have had the opportunity of revising the Hydnums of the Herbarium at Vienna, and part of the collections of Dr. W. H. Snell, Providence, R.I., which yielded three more localities of this apparently Central European species. They are: —

Austria: Steiermark, Aussee, Sept. 1909, *K. Rechinger* (as *Hydnum* sp.; W 15363).

Austria: Tirol, Mutteralpe near Innsbruck, 27 Aug. 1922, *V. Litschauer* (as *Hydnum aurantiacum*; W 9924).

Germany: Bavaria, Mittelfranken, Kreis Hersbruck, Hersbruck, Kutscherberg, 20 Aug. 1946, *K. Starcs 2300* (as *Hydnum ferrugineum*; Herb. W. H. Snell).

*b a d i u s.* — *Hydnum imbricatum* var. *badium* (Pers.) Duby, Bot. Gall. **2**: 775. 1830. — *Sarcodon imbricatus* subsp. *S. badius* (Pers.) Bourd. & Galz. *in* Bull. Soc. mycol. France **40**: 107. 1924 ("*badium*").

Two recombinations to be included in the synonymy of *Sarcodon imbricatus*, Part I: 53.

*b a r b a t u s.* — [*Agaricus barbatus* Batt., Fung. Agri arim. Hist. 67. 1755 (non-binomial name). —] *Hericium barbatum* Pers., Mycol. europ. **2**: 155. 1825. — Type: represented by Batt., Fung. Agri arim. Hist. pl. 33 fig. C. 1755.

The species, as described and figured by Battarra, seems to have no stipe. This is why Persoon was in doubt whether the species had not better be placed in *Odontia*. On the other hand, *Hericium barbatum* may have had a hidden root, as is the case in *Hericium bresadolae* (see Part IV: 131). Possibly even both names refer to the same species, but since this cannot be proved, *Hericium barbatum* must remain a nomen dubium.

*b a r b a t u s.* — *Hydnum barbatum* Rafin. *in* Med. Repos., Hexade 2, **5**: 363. 1808 (n.v.); *in* J. Bot. (ed. Soc. Bot.), Paris **1**: 234. 1809; *ex* Steudel, Nomencl. bot. **2**: 202. 1824; Sacc., Syll. Fung. **6**: 477. 1888 ("*barbarum*"). — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 3 fig. to the left. no date (in ed.).

Going by the illustration it seems not an altogether wrong guess that Rafinesque described a comparatively young specimen of a *Hydnellum*. This is all that can possibly be said, for the diagnosis ("pedunculated, whitish, peridium obovated, irregularly truncated, barb slender") is too incomplete to allow further identification, and Rafinesque's binomial should be discarded as being a nomen dubium.

The reference cited above in connection with the illustration of Rafinesque's species is an unpublished collection of plates (Gerard, 1885) now preserved at the Library of the New York Botanical Garden. I owe the perusal of a photocopy of this collection to Dr. M. A. Donk.

*b o h e m i c u s.* — *Hydnum bohemicum* Vel., České Houby 752. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 274. 1948). — Part of type: "*Hydnum bohemicum* Vel., Bohemia centr., distr. Říčany u Prahy: in Piceetis atque Fagetis apud pag. Jevany sparse, IX 1916, leg. *Velenovský*" (PRC).

The specimen I have seen, which on the label bears the annotation "Merotypus", is a fragment of the pileus, taken from near the margin. The surface is matted, yellowish brown with a purplish tint, blackened in places. A number of the spines are pale chocolate brown. Context pale yellow-brown, not discolouring in a solution of KOH, but pockets of excreted matter staining red-brown. Hyphae with clamp connections. Taste not checked because of scantiness of material. However, the characteristics of the flesh are sufficient proof that *Hydnum bohemicum* is identical with *Hydnellum diabolus*.

*b r a c h y p u s.* — *Hydnum laevigatum* var. *brachypus* Fr., Obs. mycol. **1**: 140. 1815. — Type locality: Sweden.

It is impossible to say what was meant by Fries.

*b r e v i p e s.* — *Hydnum brevipes* Opiz *in* Lotos **5**: 42. 1855; not *Hydnum brevipes* (Coker) Snell *in* Mycologia **37**: 48. 1945 = *Sarcodon stereosarcinon* Wehm. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mergenthal.

It is impossible to identify the species from the meagre information supplied by its author.

*b r e v i p e s.* — *Sarcodon brevipes* Coker *in* J. Mitchell sci. Soc. **55**: 375. 1939 (without Latin description). — *Hydnum brevipes* (Coker) Snell *in* Mycologia **37**: 48. 1945; not *Hydnum brevipes* Opiz *in* Lotos **5**: 42. 1855. — Type: *Coker 10253* (not seen; NCU).

Since the name of Coker's species was not validly published, *Sarcodon stereosarcinon* Wehm., which Coker & Beers (1951: 54) cited as a synonym, becomes the correct name.

*b r i t z e l m a y r i.* — *Hydnum britzelmayri* Sacc., Syll. Fung. **11**: rear side of frontpage. 1895. See under *Hydnum fragrans* Britz.

*b r u n n e o - o l i v a c e u s.* — *Phellodon brunneo-olivaceus* Coker & Beers, Stip. Hydn. east. U.S. 28, pl. 18 upper fig. 1951 (without Latin description). — Type: "*Phellodon brunneo-olivaceus*, North Carolina, Highlands. No. *12593*" (NCU).

I have seen the type (as well as what was indicated as Hesler No. *5223*, from Georgia, Rabun County) which is characterized by the evenly olivaceous tint and the concentrical corrugations of the pileus. Coker & Beers stated the pileus of their species to be zonate, but I am convinced that by it they meant those concentrical wrinkles (which give rise to alternating rings of light and shadow), for there is no trace of colour-zonation. The lack of a white-tomentose margin indicates that the specimens were already old when collected. This also explains why the tomentum, often very thin in *Phellodon melaleucus*, had completely collapsed to a glabrous surface, and there is nothing unusual in the fact that such a surface acquires a certain sheen in the process. Coker & Beers emphasized among others the prevailingly smaller size of the specimens, distinguishing their species from *P. melaleucus*, but, as already pointed out on an earlier occasion, size in Hydnums is, in my eyes, of only very limited value. Apart from the colour, I fail to find any fundamental difference between *Phellodon brunneo-olivaceus* and *P. melaleucus*, and I am, therefore, of opinion that the former is nothing more than a colour modification of the latter.

*b r u n n e o r o s e u s.* — *Phellodon brunneoroseus* Snell, Dick, & Jackson *apud* Snell & al. *in* Lloydia **19**: 171. 1956. — Type: "*Phellodon brunneoroseus*, Canada, Quebec,

St. Aubert, 9 Sept. 1951, *Jackson & Snell, No. 2892*" (Herb. W. H. Snell; part of type in L).

A very detailed description was supplied by the authors of the present species, comparing its characters also with those of *P. brunneo-olivaceus*. Similar to that species, I now incline to the view that *P. brunneoroseus* is a colour modification of *Phellodon melaleucus*.

*caerulescens*. — *Hydnum caerulescens* Rafin. *in* Med. Repos., Hexade 2, **5**: 363. 1808 (n.v.); *in* J. Bot. (ed. Soc. Bot.), Paris **1**: 234. 1809; *ex* Steudel, Nomencl. bot. **2**: 202. 1824 ("*coerulescens*"). — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 3 fig. to the right. no date ("*cerulescens*"; ined.).

Like *Hydnum barbatum*, this species probably belongs to *Hydnellum*. The specific epithet suggests *Hydnellum caeruleum*, but juvenile specimens of *Hydnellum alachuanum* are also stated to have a bluish pileus, while very young fruit-bodies of *H. suaveolens*, apart from a bluish pileus, have a dark blue stipe which is even more apt to attract the attention. If *H. alachuanum* is excluded from consideration on the grounds that it has only been recorded from Florida and South Carolina, whereas Rafinesque found his species near Burlington, New Jersey, there still remains to choose between *H. caeruleum* and *H. suaveolens*. In view of the very short diagnosis which gives no information on the colour of the context, it is impossible to make the choice, and *Hydnum caerulescens* must remain a nomen dubium.

*caeruleus*. — *Hydnum suaveolens* var. *caeruleum* (Hornem. ex Pers.) Hornem., Nomencl. Fl. dan. 65. 1827 ("*coeruleum* Fr."). — *Hydnum suaveolens* subsp. *H. caeruleum* (Hornem. ex Pers.) Fr., Epicr. Syst. mycol. 507. 1838 ("*coeruleum*"). — *Phellodon caeruleus* (Hornem. ex Pers.) R. Nav. *in* Natuurwet. Tijdschr., Antw. **5**: 67. 1923 ("*caeruleum*"). — *Hydnellum caeruleum* (Hornem. ex Pers.) Wehm., Fungi New Brunsw., Nova Scotia and Pr. Edw. Isl. 68. 1950 (combination antedated).

These are all recombinations omitted from the list of synonyms under *Hydnellum caeruleum*, Part II: 54. With regard to the reference '*Hydnum suaveolens β H. caeruleum* Hornem. ex Fr.', I ought to have indicated that, because of the inadmissible use of a binary combination for a variety, Fries's recombination is not validly published. See also remarks under '*gracilis*'.

*caeruleus*. — *Hydnum caeruleum* Thore; Fr., Syst. mycol. **1**: 406. 1821; not *Hydnum caeruleum* Hornem. *ex* Pers., Mycol. europ. **2**: 162. 1825 = *Hydnellum caeruleum* (Hornem. ex Pers.) P. Karst.

Fries mentioned this species in small type at the end of his tribus *Mesopus*, together with a few others, of which he was uncertain as to their identity. Since there is no such name like *Hydnum caeruleum* Thore, it seems quite probable that Fries had *Hydnum violaceum* Thore apud Pers. in mind. Contrary to his opinion ("forsan idem ac *H. violascens*"), however, that species has nothing in common with *Hydnum violascens* except the sound of its name. The identity of the former, as pointed out in Part III: 59, is unknown; the latter is *Bankera violascens*.

*caespitosus.* — *Hydnum caespitosum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p.?, pl. 47 fig. 3. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

*candicans.* — *Hydnum cyathiforme* var. *candicans* (Fr.) Cost. & Duf., Nouv Fl. Champ. 160. 1891. — *Hydnum cyathiforme* f. *candicans* (Fr.) Killerm. *in* Denkschr. bayer. bot. Ges. **15**: 43. 1922.

Two overlooked recombinations to be inserted in Part III: 55. The position of *Hydnum candicans* which I previously considered synonymous with *Phellodon tomentosus*, is actually far from clear. Juvenile specimens of *P. tomentosus* may be found to have the pileus entirely white-tomentose, but Krombholz's illustration on which Fries based his species does not in the least give the impression of representing very young specimens. While, therefore, one may doubt whether *H. candicans* is correctly placed in *P. tomentosus*, it is certainly true that the white stipe, as depicted by Krombholz, agrees with none of the European species. I wonder how *Hydnum candicans* would compare with North American *Phellodon putidus*, of which I have only seen descriptions and illustrations.

*candidus.* — *Hydnum candidum* Schmidt *in* Mykol. Hefte **1**: 89. 1817; *ex* Fr., Syst. mycol. **1**: 400. 1821; not *Hydnum candidum* Willd. *in* Mag. Bot. (ed. Römer & Usteri) **2** (4): 14, pl. 3 fig. 7. 1788 = *Radulum quercinum* (Pers. ex Fr.) Fr.; not *Hydnum candidum* (Ehrenb.) *ex* Schlecht., Fl. berol. **2**: 197. 1824 = *Irpex candidus* Weinm. = form of *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk. — *Sarcodon candidus* (Schmidt ex Fr.) Quél., Ench. Fung. 189. 1886 ("*candidum*"). — *Tremellodon candidus* (Schmidt ex Fr.) Quél., Fl. mycol. 440. 1888 ("*candidum*"). — *Malacodon candidus* (Schmidt ex Fr.) Bataille *in* Bull. Soc. mycol. France **39**: 203. 1924 ("*candidum*"). — Type locality: Germany, Saxonia.

Schmidt described the context as "fleischig-gallertartig", which at once suggests that the present species belongs to the heterobasidiomycetous fungi. Among these, however, I fail to find any species that agrees with Schmidt's description, and for that reason I regard *Hydnum candidum* as a nomen dubium. From this it follows that the monotypic genus *Malacodon*, based by Bataille (l.c., p. 203) on *Hydnum candidum*, is also a nomen dubium.

I would not have treated the present binomial in this paper if it were not for the fact that Quélet at one time regarded the species as a member of the genus *Sarcodon*.

*canus.* — *Hydnum canum* Schw. *in* Schr. naturf. Ges. Leipzig **1**: 103. 1822. — Type locality: U.S.A., North Carolina.

Fries, in his 'Epicrisis' (p. 506), regarded *Hydnum canum* as a synonym of his *Hydnum* (*laevigatum* subsp. *H.*) *gracile*, which see for discussion. It is not possible to identify the latter with any degree of certainty, hence *Hydnum canum* is a nomen dubium.

*carnosus.* — *Phellodon carnosus* Banker *in* Mycologia **5**: 65. 1913. — *Bankera carnosa* (Banker) Snell, Dick, & Taussig *apud* Snell & al. *in* Lloydia **19**: 174. 1956. — Type: New York, Bleecker pond near Gloversville (not seen; NY).

See under '*mollis*'.

*catalaunicus.* — *Sarcodon catalaunicus* R. Maire *in* Publ. Inst. bot. Barcelona **3** (4): 34. 1937.

See under '*fuligineo-violaceus*'.

*cervinus.* — *Hydnum cervinum* Berk. *in* Hook., Fl. Tasman. **2** (3): 256. 1860; not *Hydnum cervinum* Pers. *ex* Pers., Mycol. europ. **2**: 158. 1825.

Berkeley's binomial has been omitted in Part I: 53. It has nothing to do with Persoon's *Hydnum cervinum* which is a synonym of *Sarcodon imbricatus*. According to Cunningham (1953: 279), Berkeley's species belongs to *Grandinia*.

*cinereus.* — *Phaeodon cinereus* (Bull. ex Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

To be inserted in Part III: 58.

*citrinus.* — *Hydnum citrinum* Rafin. *in* Med. Repos., Hexade 2, **5**: 363. 1808 (n.v.); *in* J. Bot. (ed. Soc. Bot.), Paris **1**: 234. 1809; *ex* Steudel, Nomencl. bot. **2**: 203. 1824; not *Hydnum citrinum* Zoll. & Mor. *apud* Zoll. *in* Natuur- en geneesk. Arch. Ned. Ind. **1**: 385. 1844; not *Hydnum citrinum* Saut. *in* Hedwigia **8**: 64. 1869; *in* Mitt. Ges. salzb. Landesk. **18**: 150. 1878. — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 7 fig. to the left. no date (ined.).

With regard to the citation of the illustration, I refer to *Hydnum aurantium*. This illustration gives the impression of the fruit-body being excentrically stalked. The stipe is very slender, and the fruit-body is described as light yellow. There are very few Hydnums combining these features, in fact the only suggestion I can give at present is that Rafinesque's species might represent *Steccherinum pusillum*.

*citrinus.* — *Hydnum citrinum* Saut. *in* Hedwigia **8**: 64. 1869 (name change for *Hydnum sulfureum* Saut.); *in* Mitt. Ges. salzb. Landesk. **18**: 150. 1878 (n.v.); not *Hydnum citrinum* Rafin. *ex* Steudel, Nomencl. bot. **2**: 203. 1824; not *Hydnum citrinum* Zoll. & Mor. *apud* Zoll. *in* Natuur- en Geneesk. Arch. Ned. Ind. **1**: 385. 1844. — Type locality: as of *Hydnum sulfureum*.

I have not seen Sauter's publication of 1878, in which, as stated by von Keissler (1917: 108), he seems to have admitted that his species was identical with *Hydnum geogenium* Fr. It is not true, however, that *H. citrinum* is a nomen nudum; it is a name change for *Hydnum sulfureum*, described on an earlier occasion (see there).

*colosseus.* — *Hydnum colosseum* Bres. *in* Atti Accad. Agiati, ser. 3, **8**: 130. 1902 ("*colossum*"; n.v.). — *Sarcodon colosseus* (Bres.) Bataille *in* Bull. Soc. mycol. France

**39**: 207. 1924 ("*colossum*"). — Type: "*Hydnum colossum* Bres. In pinetis / Setubal / Xbri 1901. *Torrend*" (S).

The type specimen consists of four lumps, two of which are halves of the stipe, and the other two, fragments of the pileus. The brownish, roughly tuberculate spores and the homogeneous context which is made up of inflated hyphae, are certain indications that the present species is a *Sarcodon*. The pale colour of the context throughout the fruit-body and the very large clamp connections make it clear that the species belongs to Group 3 of that genus. Further identification of the species as *Sarcodon laevigatus* gives no difficulties since the purplish brown pileus is devoid of scales. It is not, however, the species as understood by Fries, but *Sarcodon laevigatus* in the sense of Bourdot & Galzin and Konrad & Maublanc on account of "the strong and nauseating odour, and the bitterish taste of the flesh" (translated from Saccardo, Syll. Fung. **17**: 148. 1905). Compare also, however, the remarks under *Sarcodon fragrans*.

Another collection under the name of "*Hydnum colossum*", surroundings (illegible) of Setubal, Dec. 1901, *C. Torrend* (COI), also represents *Sarcodon laevigatus*.

*communis*. — *Hydnum tomentosum* var. *commune* Alb. & Schw., Consp. Fung. 206. 1805.

To be included in the synonymy of *Hydnum tomentosum* in Part III: 54.

*commutatus*. — *Sarcodon commutatus* Bourd. & Galz. *in* Bull. Soc. mycol. France **40**: 109. 1924.

See under '*fuligineo-violaceus*'.

*concrescens*. — *Hydnum concrescens* Pers. *ex* Schw. *in* Schr. naturf. Ges. Leipzig **1**: 103. 1822 (validly published?); Opiz, Böh. Gew. 158. 1823.

*Hydnum concrescens*, a synonym of *Hydnellum velutinum* var. *scrobiculatum*, was not, as stated in Part. II: 61, validated by Persoon (1825) but by Opiz, if not by von Schweinitz.

*confluens*. — *Hydnum confluens* Peck *in* Rep. N.Y. St. Mus. **26**: 71. 1874; not *Hydnum confluens* Pers., Mycol. europ. **2**: 165. 1825. — *Phaeodon confluens* (Peck) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — Type: "*Hydnum confluens* Pk. / New Scotland / *C. H. Peck*" (NYS).

Contrary to his habit, Peck did not mention the locality of this new species, but it can be safely assumed to be New Scotland as indicated on the label of the type box. The word "Gansevoort" must to all appearance have been added afterwards, and in any case the material from that locality which is included in the same box differs from Peck's description in its much smaller size, and in the lack of the "dense mycelioid tomentum" which, as shown in the two accompanying water-colour sketches, surround the stipe. Apart from that, however, the material from Gansevoort agrees with the two type specimens in general colour (which is a fairly pale olive

green, not drab brown as stated by Peck), whitish spines, and tough black core of the context. These characters readily identify *Hydnum confluens* of Peck as *Phellodon niger*.

*c o n f l u e n s.* — *Hydnum concrescens* var. *confluens* Pers.; Fr., Elench. Fung. **1**: 131. 1828.

Fries, in enumerating this variety as a synonym under *Hydnum subtomentosum*, and referring to Persoon, Mycol. europ. **2**: 165. 1825, made two errors. Persoon, in the preface to his 'Synopsis Plantarum' (p. x) wrote: "Speciebus obscuris, aut quoad sedem dubiis, vel accuratiori indagatiori subjiciendis, signa crucis seu asteriscum apposui." This clearly indicates that Persoon had meant his *Hydnum confluens* as an independent species, not as a variety of *Hydnum concrescens*, even if it is true that he tentatively used the word variety to suggest their possible relation (p. 166: "cum antecedente [*H. concrescens*], cujus aetatem nondum plane adultam aut varietatem exhibere videtur"). The following passage quoted from the discussion under *Hydnum *fuscum* Pers. (Mycol. europ. **2**: 189. 1825) may serve as another example: "Ut speciem *incertam* interim indicare, melius esse arbitratus sum . . ."

*Hydnum subtomentosum*, as already pointed out in Part III: 54, is an error for *Hydnum tomentosum*.

*c o n n a t u s.* — *Hydnum connatum* C. F. Schultz, Prodr. Fl. stargard. 491. 1806; *ex* Fr., Syst. mycol. **1**: 405. 1821. — *Hydnellum connatum* (C. F. Schultz ex Fr.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — *Phaeodon connatus* (C. F. Schultz ex Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — Type locality: Germany, Mecklenburg-Strelitz, between Eichhorst and Gliencke, near Stargard.

Fries made the following comment on this species: "Inter numerosas antecedentis formas equidem nullam in hoc quadrantem reperi." By it he meant to say that he had never come across anything resembling *Hydnum connatus* among the numerous forms of what he called *Hydnum cyathiforme*, which, as shown in Part II: 61, comprises *Hydnellum velutinum* var. *scrobiculatum* and var. *zonatum*. Fries's remark, together with the brown colour of the pileus ("pileo . . . spadiceo"), firmly inculcated in me the idea that *H. connatum* was a *Hydnellum*. Of course, there is only myself to be blamed for having overlooked that the original diagnosis of Schultz contains two pieces of information ("subulis . . . ochraceo cinereis", and "stipite nigro nitente-glabro") which leave no doubt as to the identity of the species. The colour of the spines points to *Phellodon*, and the nature and the colour of the surface of the stipe are characteristic of *P. melaleucus*. Where the colour of the pileus is concerned, it should be remembered that *P. melaleucus* is a variable species indeed (compare also '*brunneo-olivaceus*', '*brunneoroseus*', and '*hepaticus*').

It may be worth while to see what became of *Hydnum connatum* in the mind of Fries. This author, in his "Epicrisis' (p. 509) introduced a new feature ("pileo sericeo zonis discoloribus", apparently under the influence of Secretan's *Hydnum*

*variecolor*), and slightly twisted two of the original characters ("stipite . . . fusco-nigro", and "aculeis . . . carneo-ochraceis"), which is a divergence from the former conception of the species. *Hydnum connatum* sensu Fries (1838, 1874), in my eyes, represents *Phellodon tomentosus*.

*coriaceus*. — *Hydnum laevigatum* var. *coriaceum* Fr., Obs. mycol. **1**: 140. 1815. — Type locality: Sweden.

Like *Hydnum laevigatum* var. *brachypus*, I fail to identify this variety. See also under '*gracilis*'.

*crispus*. — [*Hydnum octavum* Schaeff., Fung. Icon. **2**: pl. 147 fig. 1. 1763. —] *Hydnum crispum* Schaeff., Fung. Icon. **4**: 97. 1774 (pr. p.); *ex* Fr., Syst. mycol. **1**: 413. 1821; not *Hydnum crispum* Scop., Fl. carniol., ed. 2, **2**: 473. 1772 = *Hericium coralloides* (Scop. ex Fr.) S. F. Gray. — *Irpex crispus* (Schaeff. ex Fr.) Fr., Epicr. Syst. mycol. 521. 1838. — Type locality: Germany, Bavaria.

Fries, and earlier also Persoon in his 'Commentarius' (1800: 58), restricted the present binomial to a non-stipitate, lignicolous or arboricolous species with complicated, overlapping caps which I fail to identify. The reason why the epithet is enumerated here is that Schaeffer in his description also included apparently terrestrial, solitary, stipitate specimens, exemplified by Plate 147 fig. 2–6 which in my opinion represent *Hydnellum velutinum* var. *scrobiculatum*.

*curtisii*. — *Hydnum curtisii* Berk. *in* Grevillea **1**: 71. 1872. — Type: "*Hydnum laevigatum*, Swartz [in pencil] *Curtisii*, B. [in ink]. No. 2809. Car. Inf. Aug." (K).

The type is a very small, badly dried specimen with the entire surface of its pileus glued to a piece of paper. It must have been immature at the time it was collected, for the majority of the basidia of the two spines examined had not even developed sterigmata. The few spores to be seen, however, were already very roughly tuberculate. This fact, combined with the appearance of the hyphae (not strictly parallel, flexuous, thin-walled, very much inflated in some places, collapsed in others), characterizes the specimen as a *Sarcodon*. The additional feature of the presence of clamp connections restricts it as belonging to Group 3. Having been collected in South Carolina, the obvious thing to do is to compare the species with the North American Sarcodons, but, unfortunately, there are so many of them, some of which are even imperfectly known from a microscopical point of vue. Leaving out the species which are known for certain to have no clamp connections, there are still the following to choose from: *Sarcodon excentricus*, *S. imbricatus*, *S. laevigatus*, *S. scabripes* (hyphae known to possess clamps), and *S. atroviridis*, *S. cristatus*, *S. fumosus*, *S. piperatus*, and *S. underwoodii* (no information on the presence of clamps). Taking into consideration that Berkeley described the pileus as smooth ("pileo . . . laevi"), *S. imbricatus* may be definitely ruled out, since in this species even the youngest stages have their caps crowned with coarse scales. In my opinion, *S. laevigatus* is unlikely, as that species usually possesses very large clamp connections, strikingly different from the ones I observed in *Hydnum curtisii*, and it certainly

would not be described as "fuligineo-fuscum". However, even with these two species subtracted, the pitiable amount of information supplied by its author renders it impossible to assign *Hydnum curtisii* to any of the remaining species.

*cyathiformis.* — *Calodon cyathiformis* (Fr.) Imaz. *apud* Imazeki & Hongo, Coll. Ill. Fungi Japan 106. 1957 (incomplete reference to basinym); not *Calodon cyathiformis* (Schaeff. ex St.-Amans) Quél., Ench. Fung. 191. 1886.

In his reply to my inquiry where the above recombination had first been published, Dr. Imazeki contritely confessed that it should be considered a lapsus calami for "*Calodon cyathiformis* (Fr.) Quél." It should be pointed out, however, that Imazeki has fallen a victim to a wide-spread confusion between *Hydnum cyathiforme* Fr. (= *Hydnellum velutinum*) and *H. cyathiforme* Schaeff. ex St.-Amans (= *Phellodon tomentosus*); see also Donk (*in* Taxon **6**: 254. 1957). When publishing his *Calodon cyathiformis*, Quélet clearly referred to Schaeffer's species, so *Calodon cyathiformis* (Fr.) is a recombination to be attributed to Imazeki. A complication is that Fries distinguished two forms of *Hydnum cyathiforme*, a. and b., the former being a synonym of *Hydnellum velutinum* var. *scrobiculatum* and the latter, of *H. velutinum* var. *zonatum*. However, in view of the fact that (i) Imazeki & Hongo also listed *Calodon zonatus*, and (ii) the illustration of *C. cyathiformis* (Plate 49 fig. 277) gives a passable picture of *H. velutinum* var. *scrobiculatum*, it can be suggested that *Hydnum cyathiforme* form a. should be regarded as basinym of Imazeki's recombination.

*cyathiformis.* — *Agaricus cyathiformis* (Schaeff.) Paul., Iconogr. Champ. pl. 4 fig. 3. 1812–35.

In the legend to his plate Paulet mentioned the French name "Agaric iris en coupe", with a reference to "Tom. 2. P. 81". In this work (Traité Champ. **2**: 81. 1793) a description is given which by the words, "dans celle-ci, elle [la partie inférieure] se trouve épineuse" proves the illustration to represent a stipitate Hydnum. Since Paulet was acquainted with Schaeffer's work, it may be assumed that *Agaricus cyathiformis* is a recombination of the latter author's *Hydnum cyathiforme*, and as such it should be included in the synonymy of *Phellodon tomentosus* in Part III: 54. Very likely, however, the recombination is a misapplication. Dr. Donk kindly drew my attention to the similarity of Paulet's figure to that shown by van Sterbeeck (Theatrum Fung., 2 ed., pl. 27 fig. I. 1712) which, going by its description on p. 258, represents *Polystictus perennis* (L. ex Fr.) P. Karst.

*decolorosus.* — *Hydnum decolorosum* Britz., Hym. Südbayern **8**: 14. 1891 (n.v.); Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 213, fig. Hydnei 34. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type locality:Germany, Bavaria.

The drawings of the present species (showing six fruit-bodies in colour, and five more in black and white in longitudinal section) at once suggest *Bankera fuligineo-alba*. They are in fact not markedly different from the figure of *Hydnum sparso-aculeatum*

(Fig. 47) which I do not hesitate to identify with that species. Most elements of the description (of 1910) of *H. decolorosum* are equally in agreement with this view. Only the description of the flesh as "beim Anschnitt unt[en] im St[iel] blaugrün anlaufend, von unangenehmem Geschmack" is totally incompatible with *Bankera fuligineo-alba*. The explanation may be that Britzelmayr had mixed up his collection with a few specimens of *Sarcodon amarescens*, accidentally not included in Fig. 34.

*diabolicus*. — *Hydnum diabolicum* J. Rick *in* Ann. mycol., Berlin **2**: 244. 1904. — Type locality: "prope Sao Leopoldo, Brasiliae".

The pileus is stated to be fleshy, and the spores brown, strongly verrucose. From this description *H. diabolicum* clearly belongs to *Sarcodon*, but otherwise I fail to identify the species.

*diabolus*. — *Hydnellum diabolus* Banker *in* Mycologia **5**: 194. 1913. — *Hydnum diabolus* (Banker) Trott. *in* Sacc., Syll. Fung. **23**: 470. 1925. — *Calodon diabolus* (Banker) Murrill *in* Lloydia **14**: 116. 1951; Snell *apud* Snell & al. *in* Lloydia **19**: 166. 1956.

The above recombinations are given to replace those enumerated in Part II: 58. See also under '*reticulatus*'.

*dilatatus*. — *Hydnum dilatatum* Rafin. *in* Med. Repos., Hexade 2, **5**: 363. 1808 (n.v.); *in* J. Bot. (ed. Soc. Bot.), Paris **1**: 234. 1809; *ex* Steudel, Nomencl. bot. **2**: 203. 1824. — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 7 fig. to the right. no date (ined.).

For the citation of the illustration I refer to *Hydnum aurantium*. I can make no suggestion as to the identity of the species.

*dolichopus*. — *Hydnum imbricatum* f. *dolichopus* C. Massal. *in* Atti Accad. Verona, ser. 4, **3**: 73 (reprint). 1902 (n.v., for description, see Sacc. & D. Sacc. *in* Sacc., Syll. Fung. **17**: 148. 1905). — Type locality: Italy, near Tregagno.

Judging from the very brief diagnosis which emphasizes the small scales of the pileus, it is quite possible that forma *dolichopus* actually represents a different species from *Sarcodon imbricatus*. The lateral position of the stipe would suggest *Sarcodon laevigatus*.

*eleosma*. — *Hydnum eleosma* Pers., Mycol. europ. **2**: 163. 1825.

See under *Hydnum fraceolens*.

*fennicus*. — *Phaeodon fennicus* (P. Karst.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

To be inserted in Part I: 52.

*ferrugineo-albus*. — *Hydnum ferrugineo-album* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 177. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2):

215. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 63. 1894.

The consistency and colour of the context ("korkhart ... dunkelrotbraun, etwas gezont"), and the yellow-brown spores readily identify Britzelmayr's species as a *Hydnellum* of Group 1. From the words, "H[ut] ... grob furchig, grubig faserig", and the figure which shows imbricately overlapping, thin-fleshed, azonate caps, it is further clear that *H. ferrugineo-album* is fully identical with *Hydnellum velutinum* var. *scrobiculatum*.

*ferrugineus*. — *Phellodon ferrugineus* (Fr. ex Fr.) R. Nav. *in* Natuurwet. Tijdschr., Antw. **5**: 68. 1923 ("*ferrugineum*").

This recombination has been overlooked and should be inserted in Part II: 60.

*foetidus*. — *Hydnum foetidum* Rabenh., Deutschl. Kryptog.-Fl. **1**: 411. 1844; not *Hydnum foetidum* Secr., Mycogr. suisse **2**: 509. 1833; not *Hydnum foetidum* Vel., České Houby 744. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 272. 1948) = *Sarcodontia setosa* (Pers.) Donk. — Type locality: Sweden.

Rabenhorst, in taking up Secretan's epithet (which is a nomen nudum), is not to be considered to have validated *Hydnum foetidum* of Secretan, since his description is a true translation of Fries's diagnosis of *Hydnum squamosum* (Epicr. Syst. mycol. 505. 1838). It follows that Rabenhorst merely published a new name for *Hydnum squamosum* Schaeff. ex Fr. sensu Fr., and also that *Hydnum foetidum* Rabenh. should be typified by the same type as that species. Now it should be recalled that *Hydnum squamosum* as conceived by Fries is a misapplication (cf. Part IV: 134), so that its type is not the same as that of *H. squamosum* Schaeff. Since there is no type of Fries's species, the type locality only can be indicated, this being Sweden.

*foetidus*. — *Hydnum foetidum* Secr., Mycogr. suisse **2**: 509. 1833 (nomen nudum); not *Hydnum foetidum* Rabenh., Deutschl. Kryptog.-Fl. **1**: 411. 1844; not *Hydnum foetidum* Vel., České Houby 744. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 272. 1948) = *Sarcodontia setosa* (Pers.) Donk. — Type locality: Switzerland, Bosquets de Prilly.

Secretan likened his species to Schaeffer's *Hydnum squamosum* and, questioningly, also to *Hydnum laevigatum*. As pointed out in Part IV: 140, *Hydnum squamosum* may well represent a drought-form of *Hydnum repandum* var. *repandum*. Judging from Secretan's description, it is improbable that *H. foetidum* should be identified with that species: "... le centre [du chapeau] déprimé, même en un trou profond ... Chair ... dure .... L'odeur est fétide, comme d'huile rance." In contrast to this, Secretan described the consistency of the flesh in *H. repandum* as "ferme", and the odour as "bonne". In the older state, the interior of the stipe of *H. foetidum* is described as hollow, blackish brown, and the odour as "plus douce". The fetid odour, especially, is reminiscent of the odour of *Sarcodon laevigatus* as described by Bourdot & Galzin and Konrad & Maublanc, but in this species the pileus is not known to have a deep depression in the centre which extends into the hollow stipe, and also

the colours of *H. foetidum* are not at all those of *Sarcodon laevigatus*. To me *Hydnum foetidum* remains a dubious species, of which not even the genus can be determined with accuracy.

The specific epithet introduced by Secretan is a nomen nudum, because no specific description, and only two varietal descriptions were given.

*f r a c e o l e n s.* — *Hydnum fraceolens* Brot., Phitogr. Lusit. sel., Fasc. 1: No. 35. 1801; Fl. lusit. **2**: 470. 1804; Phytogr. Lusit. sel. **1**: 202, pl. 82 fig. 1, 2. 1816; *ex* Fr., Syst. mycol. **1**: 402. 1821. — *Calodon fraceolens* (Brot. ex Fr.) Quél., Ench. Fung. 190. 1886. — *Phaeodon fraceolens* (Brot. ex Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — *Hydnum eleosma* Pers., Mycol. europ. **2**: 163. 1825 (name change). — Type: not known to be in existence. — Type locality: Portugal, "in pineto de Marrocos, prope Conimbricam."

Neither the original description of 1801, repeated in 1816, which is surprisingly detailed for its time, nor the figures published by its author, agree with any of the species known from Europe or North America. The number of species to choose from is a limited one, for obviously *Hydnum fraceolens* is a *Hydnellum*. This may be gathered from the words, "Pileus . . . demum fuscus, intus farctus et fibrosus, coriaceus, seu spongioso-sublignosus, . . . inferne aculeis concoloribus" as well as from the observation that the "pileus interdum graminum aut aliarum vicinarum plantarum foliis transfixus invenitur." However, the colour description of the pileus as, "primum ex viridi-testaceus" would make the position of the species unique in its genus, the one species coming near it being *Hydnellum geogenium*. But, while *Hydnum fraceolens* is described as having solitary fruit-bodies with an undivided, lentiform pileus which becomes plano-infundibuliform with age, and an odour reminiscent of rancid olive oil, *H. geogenium* differs in that (i) the pileus is thin-fleshed, soon becoming infundibuliform, and often complicated, (ii) the colour of the young specimens is sulphureous, and (iii) the flesh is stated to be almost odourless. It would seem, therefore, that *Hydnum fraceolens* is an independant species which is related to *Hydnellum geogenium*, and thus far only known from Portugal, where it is stated to be common (Camara, 1956: 283). However, I have examined all specimens under the name of *Hydnum* (*Phaeodon*) *fraceolens* preserved at Lisbon (LISU), as well as some material (Extremadura, leg. *Welwitsch*, and Cryptothecia lusitana No. 14) from Kew. They are all *Hydnellum velutinum* var. *scrobiculatum*. The single specimen of "*Hydnum fraceolens*" at Coimbra deviates from the collections at Lisbon and Kew in that it represents *Phellodon niger*. I do not know whether from this it should be concluded that Brotero gave a misleading description of the colour of the young fruit-body, or that later collectors consistently misapplied the name of the species.

*f r a g r a n s.* — *Hydnum fragrans* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176, fig. Hydnei 55. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 214. 1910; not *Hydnum fragrans* (Chodat & Martin) Sacc., Syll. Fung. **11**: 106. 1895. —

*Hydnum britzelmayri* Sacc., Syll. Fung. **11**: rear side of frontpage. 1895 (name change). — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 54. 1894 (selected).

Judging from the description and the figures, this is a *Hydnellum*, but it has no resemblance to any species I know. I wonder if this could be another forgotten species, as was *Hydnellum auratile*.

*fragrans*. — *Sarcodon fragrans* Chodat & Martin *in* Bull. Trav. Soc. bot. Genève **5**: 222. 189. — *Hydnum fragrans* (Chodat & Martin) Sacc., Syll. Fung. **11**. 106. 1895; not *Hydnum fragrans* Britz., Hym. Südbayern **10**: 176. 1894. — Type: apparently non-existent (information Dr. C. E. B. Bonner). — Type locality: Switzerland, Pied du Jura (Divonne), near Geneva.

The original description, a photocopy of which I received through the kindness of Dr. C. E. B. Bonner, Geneva, is sufficiently detailed for the species to be identified as belonging to the genus *Sarcodon*. Although no information is given on the presence of clamp connections, I believe the authors were correct in placing their species near *Sarcodon laevigatus*. Most probably, with the latter they meant *S. laevigatus* in the sense of Bourdot & Galzin which at one time I thought to differ from the species as understood by the Scandinavian mycologists. However, it is worth noting that in some of its characters *Sarcodon fragrans* is intermediate between these two. It has the white context of the latter, and the bitter taste of the former, but differs from both in having a pleasant odour. The uncertainty as to how both taxa should be related, stresses the necessity of collecting more detailed data in northern as well as in central European regions. See also remarks under *Hydnum uplandicum*.

*friabilis*. — *Hydnum friabile* Fr. *in* Nova Acta Soc. Sci. upsal., ser. 3, **1**: 106. 1851; not *Hydnum friabile* Rostr. *in* Medd. Foren. Svampekundsk. Fr. **2**: 94. 1920.

For discussion, see next epithet.

*friabilis*. — *Hydnum friabile* Rostr. *in* Medd. Foren. Svampekundsk. Fr. **2**: 94. 1920; not *Hydnum friabile* Fr. *in* Nova Acta Soc. Sci. upsal., ser. 3, **1**: 106. 1851.

*Hydnum friabile* Rostr. is a name change for *Hydnum fragile* Fr. which in its turn is a synonym of *Bankera fuligineo-alba* (see Part III: 57). However, Rostrup was not aware of the existence of another *Hydnum friabile* which is a name introduced by Fries for a species related to (Banker, 1906: 135), if not identical with (Coker & Beers, 1951: 8), *Steccherinum pulcherrimum*.

*fuligineo-alba*. — *Bankera fuligineo-alba* (Schmidt ex Fr.) Pouz. *in* Česká Mykol. **9**: 96. 1955.

In general, illustrations omitted from Parts I to IV are not enumerated in this paper, but an exception is made in the case of species of which there exist but few good figures. An excellent figure was published (as *Sarcodon*) by Imler [*in* Bull. Soc. mycol. France **72** (Atlas): pl. 107. 1957].

*fuligineo-violaceus.* — *Hydnum fuligineo-violaceum* Kalchbr. *apud* Fr., Hym. europ. 602. 1874; Kalchbr., Icon. sel. Hym. Hung. **4**: 58, pl. 32 fig. 2. 1877. — *Sarcodon fuligineo-albus* var. *fuligineo-violaceus* (Kalchbr. apud Fr.) Quél., Ench. Fung. 189. 1886 ("*fuligineo-violaceum*"). — *Sarcodon fuligineo-violaceus* (Kalchbr. apud Fr.) Pat., Essai taxon. Hym. 118. 1900; not *Sarcodon fuligineo-violaceus sensu* Banker *in* Mem. Torrey bot. Cl. **12**: 142. 1906 = *Sarcodon radicatus* Banker — *Sarcodon amarescens* (Quél.) Quél. (cf. Coker & Beers, Stip. Hydn. east. U.S. 38. 1951). — Type: "*Hydnum fuligineo-violaceum* Kalchbr. n. sp. / In pinetis Carpatorum ad Olaszi / Sept. 1870 / *C. Kalchbrenner*" (herb. E. Fries, UPS).

The spores of the type are pale yellowish brown under the microscope, roughly tuberculate, and irregular in outline, which is typical of two genera only, viz. *Hydnellum* and *Sarcodon*. Of these, the former may be ruled out on account of the homogeneous context, and the hyphae which are not of uniform diameter. The lack of clamp connections excludes Group 3 of the genus *Sarcodon*, while the colour of the flesh (violet in the pileus, more purplish in the stipe) precludes Groups 2 and 4, leaving Group 1 as the only possibility, of which *Sarcodon commutatus* was described in Part I: 50 as its sole member.

To me Kalchbrenner's figures remained an obstacle for a long time, since their pale colours, and more especially the colours of the flesh, gave rise to serious doubt as to whether or not the specimens I had seen from Uppsala could be considered the material from which the original description had been made. It was not until I had received, also from Uppsala, two drawings, made by Kalchbrenner and sent to Fries, that I learned how true was Bresadola's judgment on Kalchbrenner's published figures: "bene depicta sed male fucata". The drawings, both water-colours, and representing, each on a different sheet, an identical set of three specimens as reproduced on Plate 32, differ from each other in colour and the way the spines are drawn.

The specimens of the larger sheet are done in a monotonous drab purplish grey, with the context of the pileus in a slate grey that is wholly unlike the colour I have seen in the material from Uppsala. This sheet may be left out of consideration, as the colours are certainly not true to nature.

The specimens of the smaller sheet which, to judge from the manner the spines are drawn, must have served as the example from which the lithographer copied his plate, are more vividly coloured, and, in particular, the colours of the context of pileus and stipe are exactly as I found them in the type. Unfortunately, the same cannot be said of the colours of the surface of pileus and stipe, as the specimens have turned black on drying.

This digression has been necessary to show that (i) as far as the colouring is concerned the published figures of *Hydnum fuligineo-violaceum* are an extremely poor replica of the reality, and (ii) the material at Uppsala is actually the type.

The correct name of the species is *Sarcodon fuligineo-violaceus*, and synonymous with it are *Sarcodon commutatus* and *S. inopinatus*. Very probably also, and contrary to my previous opinion, *Sarcodon catalaunicus* is another synonym.

Under the name of *Hydnum fuligineo-violaceum* the Herbarium at Vienna possesses a specimen collected by Bresadola ("Margone pr. Trento, IX 1903, in pinetis") which agrees in detail with Plate 1048 of this author, and of which the most salient features are the sombre colour of the surface of the pileus and the almost blackish violet of its context. These characters distinguish the specimen from true *Sarcodon fuligineo-violaceus*, but any definite conclusions must be deferred until fresh specimens are available. It would seem that the material described by Nikolaeva (*in* Not. syst. Sect. cryptog. Inst. bot. Acad. Sci. U.S.S.R. **9**: 147. 1953) under the name of *Sarcodon fuligineo-violaceus* is essentially the same as Bresadola's specimen.

*f u l i g i n e u s.* — *Hydnum fuligineum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 177. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 216. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 59. 1894.

It needs only a few words (context suberose, brown; spores brown in mass) in order to recognize *Hydnum fuligineum* as a *Hydnellum*. Further characteristics such as coalescent fruit-bodies, squat form, and sparingly colliculose brown surface of the pileus, readily mark the present species as identical with a form (common in Western Europe) of what in Part II: 62, was called *Hydnellum velutinum* var. *spongiosipes*.

*f u l v o c o e r u l e u s.* — *Hydnum fulvocoeruleum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176, fig. Hydnei 28 b, 52, 53. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 38. 1894 (selected).

Although the glaring colours, especially those of the specimens of Fig. 38, are perhaps the most fantastic ever used to illustrate any Hydnum, they are yet unable to disguise the identity of what Britzelmayr described under *Hydnum fulvocoeruleum*, viz. *Hydnellum caeruleum*. Figure 28 b, supplemented in the text of 1910, represents a well-observed and well-drawn specimen of the same species in its first stage of decay.

*g l a b r a t u s.* — *Hydnum ferrugineum* var. *glabratum* Fr., Obs. mycol. **1**: 133. 1815. — Type locality: Sweden.

The varietal epithet was never taken up again by Fries who by it most probably meant an old stage of *Hydnellum ferrugineum* with the tomentum of the pileus collapsed to a glabrous surface.

*g r a c i l i p e s.* — *Hydnum gracilipes* P. Karst., Fungi Fenn. exs. 521. 1866 (n.v.); *in* Not. Sällsk. F. Fl. fenn. Förh. **9**: 362. 1868; *in* Bidr. Känn. Finl. Nat. Folk **25**: 291. 1876. — *Hydnellum gracilipes* (P. Karst.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — *Calodon gracilipes* (P. Karst.) P. Karst. *in* Rev. mycol. **3** / No. 9: 20. Jan. 1, 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 16. 1881. — Type: "*Calodon gracilipes* Karst." [and, somewhat lower on the same packet, the original label:] "*Hydnum*

n. sp. / Pileo pallido lutescenteferrugineo (gilvo?) tomentoso, aculeis primo albis mox fuscoferrugineis; stipes exc. fragilis / Mustiala in pineto sub muscis cum *Hydno melaleuco* / *P. A. Karsten* 20 Aug. 1866" (H).

The type material (which may be part of the type distribution) consists of a number of specimens, some of which have their caps fused. The chocolate brown spines, tuberculate spores, and uniformly thin hyphae of the context mark the type material as a *Hydnellum*. The purplish brown context of the pileus, immediately staining a dark violet, then olive green, in a solution of KOH, and the lack of clamp connections clearly indicate that the specimens belong to Group 1. The extreme thinness of the pileus and the delicacy of the stipe exclude massive *Hydnellum ferrugineum* and *H. velutinum* var. *spongiosipes*. The specimens differ from *H. velutinum* var. *velutinum* on account of the lack of the thick spongiose covering of pileus and stipe. Also, they differ from var. *scrobiculatum* and var. *zonatum* in that the pileus is perfectly smooth and azonate.

The differences mentioned above make it probable that the type represents an independent species, but more collections are urgently needed before anything definite about its position can be said. The following, mainly macroscopic, description drawn up from the type material may be helpful in the identification:—

Carpophores solitary and with central stipe, or confluent with the caps fused into a single one which then appears supported by several stipes. Pileus about 3 cm across (according to Karsten), somewhat depressed in the centre, very thin, soft-coriaceous, tomentose, tomentum on collapse turning into an almost glabrous surface, smooth, azonate, with occasional dots of excreted matter, fairly pale purplish brown (in between "Fawn Color" and "Vinaceous-Fawn" of Ridgway) with a faint ochraceous tinge in the centre. Stipe about 3 cm long (according to Karsten), slender, tapering downwards, thinly tomentose, glabrescent, concolorous with pileus or somewhat darker further down. Spines decurrent, pinkish brown to purplish brown. Context very thin and very little duplex, soft in pileus, somewhat firmer in stipe, purplish brown, staining dark violet, then olive green in a drop of KOH solution. Hyphae without clamp connections.

*g r a c i l i s.* — [*Hydnum laevigatum* var. *β. H. gracile* Fr., Syst. mycol. **1**: 400. 1821. —] *Hydnum laevigatum* subsp. *H. gracile* (Fr.) *ex* Fr., Epicr. Syst. mycol. 506. 1838. — *Hydnum gracile* (Fr. ex Fr.) Fr., Summa Veg. Scand. **2**: 326. 1849 (no reference to previously published description; nomen nudum); Fr. *in* Öfvers. Vetensk Akad. Förh., Stockh. **8**: 53. 1851. — *Phellodon gracilis* (Fr. ex Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 96. 1882. — *Sarcodon gracilis* (Fr. ex Fr.) Quél., Ench. Fung. 189. 1886 ("*gracile*"). — Type locality: Sweden, Småland.

The first reference containing the epithet '*gracile*' is here put between square brackets, since "the use of a binary combination for an infraspecific taxon [a variety] is not admissible" (Art. 24). While realizing that generally speaking it is equally inadmissible to use a binary combination for a subspecies, I am in favour of a more liberal application of the rule in the case of the 'older authors', since it was an established practice to indicate the subspecies by the repetition of the generic name.

Bearing in mind that Fries (1821: 400) considered '*gracile*' a variety of *Hydnum laevigatum* which, like all Sarcodons, is a soft-fleshed species, his description of the pileus as subtenacious introduces a character which is hard to reconcile with that genus. In my opinion it is even impossible to recognize *H. gracile* as a *Sarcodon*, for there is no species in this genus with a thin and at the same time subtenacious pileus.

In his 'Epicrisis' Fries left out the word "subtenaci", but added "aculeis . . . cano-rufescentibus", from which it may be gathered that a *Hydnellum* was most probably meant. If the pileus should be taken to have the same surface (smooth and practically glabrous) and colour (purplish grey-brown) as *Hydnum laevigatum*, for nothing is stated to the contrary, I can think of no other species than *Hydnellum gracilipes* with which *Hydnum gracilis* might be identified, but the following considerations suggest the use of caution.

In Uppsala there is an unpublished plate of *Hydnum gracile*, drawn by P. Åkerlund from dried material [and apparently different from the drawing by H. von Post, which is unknown to me, and to which Lundell referred (Lundell, 1936: 22)], but it would be difficult to prove that the specimens depicted really represent that species as originally described. First, the material was collected in an entirely different region ("Ostrogothiae, Reymyra"), and as late as 1861, so Fries, going by his memory, may have misidentified the specimens, and, secondly, the yellow-brown to ferruginous colour of the pileus looks very different from the colour in *Sarcodon laevigatus*. From this I am inclined to disregard the plate, which leaves *Hydnum gracile* with only its original description—a most incomplete description indeed. In a later description (Mon. Hym. Suec. **2**: 276. 1863) Fries introduced still other colours, which only adds to the confusion. I am, therefore, certainly not disposed to identify *Hydnellum gracilipes*, a species of which there exists well-preserved material, with *Hydnum gracile*, a species on which practically no information can be gained, and which had better be abandoned as a nomen dubium.

Fries (1821: 400), rather cryptically referred to an earlier work of his, without quoting a page number. I wonder if he could have meant *Hydnum laevigatum* var. *coriaceum* as published in his 'Observationes', and of which the diagnosis is very similar.

g *r a v e o l e n s*. — *Hydnum cyathiforme* f. *graveolens* Killerm. *in* Denkschr. bayer. bot. Ges. **15**: 43. 1922. — Type locality: Germany, Bavaria, Riegling.

To be included in the synonymy of *Phellodon tomentosus* in Part III: 54.

*g r a v e o l e n s*. — *Hydnum pullum* var. *graveolens* (Pers.) Duby, Bot. Gall. **2**: 776. 1830.

To be included in the synonymy of *Hydnum leptopus* var. *graveolens* in Part III: 50.

*g r i s e u s*. — *Hydnum cinereum* var. *griseum* Pers., Mycol. europ. **2**: 169. 1825. — Type locality: France?

The original diagnosis, fortunately supplemented by the remark that the stipe is glabrous, proves variety *griseum* to be identical with *Phellodon melaleucus*.

*heimii*. — *Hydnum heimii* Maas G. *in* Persoonia **1**: 133. 1959. — Type: represented by Heim *in* Bull. Soc. mycol. France **67** (Atlas): pl. 99. 1952 ("*Sarcodon abietum*").

Rumours have it that authoritative circles are somewhat reluctant to accept *Hydnum heimii* as validly published on the grounds that the type was not clearly indicated. I must admit that the criticism is well-deserved. Indicating the type the way I did, and merely assuming it is still there, is just as bad as not indicating a type at all.

*hepaticus*. — *Hydnum hepaticum* Kalchbr. *in* Math. term. Közl. **3**: 223, pl. 1 fig. 3. 1865. — Type: "*Hydnum hepaticum* nov. sp. / Hab. rarius inter muscos silvae Predna . . . [illegible] Olaszinum Scepusii Octob. 1860 / *Kalchbrenner* (herb. E. Fries, UPS).

The type specimens are, unfortunately, in a very bad condition, but still clearly recognizable as belonging to the genus *Phellodon* on account of the very thin pileus, the slender stipe, and the nature of the spores which are subspherical, regular in outline, spinulose, and colourless. The glabrous stipes exclude the possibility of the specimens belonging to either *P. confluens* or *P. niger*, but otherwise the agglutinated specimens are much too blackened to allow further identification. The diagnosis, however, contains two very important indications, viz. ". . . pileis . . . hepaticis", and "carne fusco-nigra". Although the term 'hepaticus' to describe a colour is far from clear, there is nothing uncertain about "seine grünlich-braune Farbe" in the translation of Kalchbrenner's annotation (*in* Hedwigia **4**: 118. 1865), and it is from this colour of the pileus, as well as from the very dark colour of the context that I conclude that *Hydnum hepaticum* is identical with *Phellodon melaleucus*.

Some of the words in Kalchbrenner's diagnosis require further explanation, e.g. "[pileis] glaberrimis . . . zonatis . . ." Under circumstances the tomentum of the pileus, already very thin, may collapse so completely as to form a perfectly glabrous surface. The pileus in *Phellodon melaleucus* is not usually zonate, the zonation rather being characteristic of *P. tomentosus*, but the illusion of a zonation may easily be brought about by concentrical corrugations. These are still visible in one of the type specimens, and Kalchbrenner's illustration is also far more suggestive of the pileus being concentrically undulate rather than alternately zoned with dark- and light-coloured bands. In connection with both the colour and the wrinkled surface of the pileus in *Hydnum hepaticum*, I would refer to the discussion under *Phellodon brunneo-olivaceus*.

*hybridus*. — *Calodon hybridus* (Bull. ex Mérat) Lindau, Kryptog.-Fl. Anfäng. **1**: 44. 1911.

An overlooked recombination to be inserted in Part II: 60.

*hybridus.* — *Hydnum compactum* f. *hybridum* Killerm. *in* Denkschr. bayer. bot. Ges. **15**: 41. 1922 ("Pers., Schaeff. 146, 4"). — Type: represented by Schaeffer, Fung. Icon. **2**: pl. 146 fig. 4. 1763.

Killermann referred the present form to Persoon, but the latter never used the epithet '*hybridum*' in a sense other than the original one given by Bulliard, and it must be put down to Killermann's account for having introduced a new subspecific epithet. Since this author quoted Schaeffer's illustration, which represents *Hydnellum aurantiacum*, forma *hybridum* is merely a synonym of that species.

*imbricatus.* — *Fungus imbricatus* (L.) Paul., Traité Champ. **2**: Index. 1793 (for description, see p. 127: Chevrotine écailleuse ou grande chevrette). — *Phaeodon imbricatus* (L. ex Fr.) J. Schroet. *in* Cohn, Kryptog.-Fl. Schles. **3** (1): 460. 1888.

These two recombinations should be included in the synonymy of *Sarcodon imbricatus* in Part I: 53. The illustration which Paulet gave of the present species under the name of *Hypothele squammata* (see under '*squammatus*') is a complete failure and it is hard to believe that the specimen depicted was drawn from nature.

*inaequalis.* — *Hydnum inaequale* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 175, fig. Hydnei 50. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910; not *Hydnum inaequale* Lindbl., Syn. Fung. hydn. Suec. nasc. 16. 1853. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 24c. 1894 (selected).

There are several features in Britzelmayr's descriptions (of 1894 and 1910) which are suggestive of *Hydnellum diabolus*: pileus convex, . . . depressed in centre, . . . red-brown, . . . always with white margin. Spines . . . flesh-coloured, then red-brown. Context with smell of meal, flesh-coloured in pileus . . . Spores brown in mass, angular . . .. On the other hand, there are other features which render such an assumption untenable. The general appearance as shown in Britzelmayr's drawing is certainly not characteristic of *H. diabolus*, mainly because of the length of the stipe. Also, the colour of the context in the stipe, described as "braunrot und schwarzbraun", is not known to occur in *H. diabolus*, at least as far as the European specimens are concerned. Finally, however harsh or even unlikely the colours may be in some cases, I have come to regard Britzelmayr's draughtsmanship as usually quite accurate. The way he would indicate, in a longitudinal section, the tough, stringy, and at the same time zoned context, is sufficiently characteristic for a particular specimen to be recognized as a *Hydnellum*. In the section of *Hydnum inaequale* the context is depicted in an entirely different manner; in fact it is drawn as it is described, being firmer on the outside than inside. From this it is safe to conclude that *H. inaequale* does not belong to *Hydnellum*, but I have to admit that I do not know with what other species it might be identified.

*inaequalis.* — *Hydnum graveolens* var. *inaequale* Peck *in* Rep. N.Y. St. Mus. **40**: 75. 1887. — Type locality: U.S.A., New York, Elizabethtown.

I have not made inquiries about the existence of type material. The description

of the pileus which is stated to be "very uneven and everywhere coated with a whitish villosity or tomentum" suggests *Phellodon confluens*.

*i n d i g o f e r u s*. — *Hypothele indigofera* Paul., Iconogr. Champ. pl. 35 bis. 1812–35 (generic name not validly published). — Type locality: presumably France.

Paulet's figure suggests a *Hydnellum*, and from the blue colour of the pileus I would think it is a grossly exaggerated representation of *Hydnellum caeruleum*. There are, however, two serious objections to this assumption, viz. the bluish stipe, and the "odeur d'iris de Florence". This odour, which is said to be heavy and sweet, would rather point to the possibility of *Hypothele indigofera* being identical with *Hydnellum suaveolens*, but in this species the pileus is never blue, once it has reached the state of maturity as shown in Paulet's figure.

Curiously enough, Paulet's figure has some resemblance to Quélet's illustration of *Sarcodon violaceus* which has been discussed in Part III: 59.

Fries, in his 'Epicrisis' (p. 507), considered the plate to represent *Hydnum* (= *Bankera*) *violascens*, which I am perfectly sure it does not.

I can see no way to identify Paulet's species.

*i n f u n d i b u l u m*. — *Hydnum infundibulum* Sw. *ex* Fr., Syst. mycol. **1**: 401. 1821.

In Part III: 58, I regarded the present species as synonymous with *Bankera violascens*. This is an error. Mr. C. Bas, during his stay in Sweden, kindly took the trouble to make a copy in water-colour of the plate of *Hydnum infundibulum* in 'Svensk Botanik'. From a study of this copy, I am now inclined to think that the species represents a *Sarcodon*, which is also in better agreement with the original description, according to which the spines turn from white to brownish or yellow-brown. The fact that *Hydnum infundibulum* is described and depicted as having a funnel-shaped pileus and a strikingly undulate margin suggests that the specimens were already old at the time of collection. This implies that the description of the species was based on specimens of *Sarcodon imbricatus* which had the scales of the pileus collapsed and subsequently washed away during a wet period. For an illustration of the changes that actually take place during the development of the pileus, I may refer to the interesting observations made by Beardslee (1924: 256). Considering that, as pointed out by Beardslee, one is not often in the position to watch the successive stages in the growth of a particular fungus, it seems quite likely that Swartz (and Fries) missed seeing the connection between *Hydnum infundibulum* and *H. imbricatum*. Fries later on did appear to be aware of the various manifestations of *H. imbricatum*, as may be seen from the words "Duplex forma: altera pileo plano squamis crassis persistentibus; altera pileo infundibuliformi squamis rarioribus demum secedentibus" (Epicr. Syst. mycol. 505. 1838), but even then he never suspected the glabrescent form to be the same as *Hydnum infundibulum*.

*inodorus.* — *Hydnum inodorum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176, fig. Hydnei 46. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 214. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 70. 1894 (selected).

Britzelmayr himself thought his species allied to *Hydnellum aurantiacum.* Apart from the colour of pileus and stipe which is rather more yellow than orange, there is only the size of the spores (6.7 × 4.5 μ), if that is a character to be relied upon, to help differentiate both species. For the present I am inclined to regard *H. inodorum* as a pale form of *Hydnellum aurantiacum.*

*inopinatus.* — *Sarcodon inopinatus* Donk *in* Med. Nederl. mycol. Ver. **22**: 62. 1933. See under '*fuligineo-violaceus*'.

*lignicola.* — *Hydnum nigrum* f. *lignicola* Britz. *in* Bot. Zbl. **62**: 312. 1895. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 72. 1894.

This is an insignificant form of *Phellodon niger.*

*macrosporus.* — *Hydnum macrosporum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 45. 1894.

Britzelmayr, who was well aware of its relation to *Hydnellum suaveolens*, differentiated the present species on account of its unusually long spores, the length of which was recorded to reach as much as 8 μ. I am unable to explain this phenomenon except as a freak, possibly a two-spored modification of a normally four-spored species. There is really nothing else in both the description and the drawing to suggest that *H. macrosporum* could be anything but *Hydnellum suaveolens.*

*maculatus.* — *Scutiger maculatus* Paul., Iconogr. Champ. pl. 34. 1812–35 (generic name not validly published).

See under *Fungus sordide-naevosus.*

*maximus.* — *Sarcodon squamosus* subsp. *S. maximus* P. Karst. *in* Hedwigia **28**: 366. 1889. — *Hydnum squamosum* subsp. *H. maximum* (P. Karst.) Sacc., Syll. Fung. **9**: 208. 1891. — Type: "*Sarcodon squamosus* subsp. *maximus* Karst. / Valkjärvi, mense Aug. 1889. leg. *P. A. Karsten*" (H).

Already Karsten himself recognized his specimens, of which a small one was sent to me on loan, as belonging to the genus *Sarcodon.* The enormous clamp connections I found on the hyphae readily identify the material as *S. laevigatus*, which is further confirmed by the purplish brown colour of the pileus and the obscurely cracked surface in its centre.

*melaleucus.* — [Unnamed species in a note to *Hydnum pullum* Sw. *in* K. svenska VetenskAkad. Handl. **31**: 249. 1810. —] *Hydnum melaleucum* Sw. *apud* Fr.,

Obs. mycol. **1**: 141. 1815 ("Swartz in litteris"); *ex* Fr., Syst. mycol. **1**: 406. 1821. — Etc.

Carelessness in reading caused me (Part III: 50) to overlook that Swartz, not Fries, is the original author of *Hydnum melaleucum*. Fries, in his 'Observationes' clearly quoted "*Hydn. melaleucum* Swartz in litteris", referring to a note by that author (l.c.) who had stated: "This may constitute a species of its own which should be determined at a later date" (translated).

The correct author citation, therefore, is *Phellodon melaleucus* (Sw. apud Fr. ex Fr.) P. Karst.

*melilotinus*. — *Hydnum nigrum* var. *melilotinum* (Quél.) Cost. & Duf., Nouv. Fl. Champ. 160. 1891.

The above recombination, antedating the one made by Lundell, should be inserted in Part III: 53.

*mirabilis*. — *Hydnum mirabile* Fr., Monogr. Hym. Suec. **2**: 349. 1863. — *Hydnellum mirabile* (Fr.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879; Wehmeyer, Fungi New Brunsw., Nova Scotia and Pr. Edw. Isl. 68. 1950; Nikol. *in* Pl. cryptog. **9**: 481. 1954; Snell & Dick *in* Lloydia **21**: 37. 1958. — *Calodon mirabilis* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 107. 1882; Snell *apud* Snell & Jackson *in* Lloydia **17**: 254. 1954. — *Phaeodon mirabilis* (Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — Type locality: Sweden, "In pinetis locis sabulosis Ostrogothiae detexit von Post." (Fries, l.c.).

In a previous paper (Part II: 58), while discussing the difference between *Hydnellum compactum* and *H. mirabile*, I expressed the opinion that "for the time being" both had best be treated as specifically different. Now that I have seen the superbly dried material distributed in Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 349 (unknown to me at that time), and some other collections from Vienna, I have satisfied myself that both species are truly distinct. The very conspicuous duplex nature of the context of the pileus of *H. mirabile* is not just a feature of Swedish specimens, becoming increasingly less pronounced in specimens from more southern regions of Europe (where they would be called *Hydnellum compactum*). On the contrary, the character is a reliable one, shown to be invariable in the following examples, and separating them from *H. compactum*, of which we possess specimens from the Netherlands, the Saar, and France. The collections of *H. mirabile* examined are from: —

AUSTRIA: South Tirol, Vahrn, unter d. Taubenbrunn, 20 July 1904, *A. Heimerl* ("nicht bitter") (W 9899).

AUSTRIA: Tirol, Ödenhaus near Innsbruck, 9 July 1935, *V. Litschauer* (W 10051).

ITALY: Castelfondo, Aug. 1903, *G. Bresadola* (W 10048).

*mollis*. — *Hydnum molle* Fr. *in* Öfvers. VetenskAkad. Förh., Stockh. **8**: 53. 1851; Monogr. Hym. Suec. **2**: 274. 1863; Icon. sel. Hym. **1**: 4, pl. 2 upper fig. 1867;

not *Hydnum molle* Schw. *in* Trans. Amer. phil. Soc. **4**: 162. 1832 = *Irpex* sp., according to Banker *in* Mem. Torrey bot. Cl. **12**: 135. 1906; not *Irpex mollis* Berk. & Curt. *in* Hook. J. Bot. **1**: 236. 1849. — *Tyrodon mollis* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 91. 1882. — *Sarcodon cinereus* var. *mollis* (Fr.) Quél., Ench. Fung. 189. 1886 ("*molle*"). — *Phaeodon mollis* (Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — *Sarcodon mollis* (Fr.) R. Nav. *in* Natuurwet. Tijdschr., Antw. **5**: 68. 1923 ("*molle*"); Bourd. & Galz. *in* Bull. Soc. mycol. France **40**: 110. 1924 ("*molle*"). — Type locality: Sweden, "In pinetis Uplandiae, hinc inde."

The fleshy substance of the context, combined with the whitish colour of the spines, of which Fries later (1867: 4) said "haud decolorantes", excludes the thought of the genera *Hydnellum*, *Phellodon*, and *Sarcodon*. The genus *Hydnum* may be excluded on the ground of the words, "pileo . . . albo canescente", for no species of that genus is known to have a pileus turning from white to greyish (for the meaning of the word 'canescens', see Kühner, 1950: 28). The one genus that remains is *Bankera*, and it is surprising to see how well both the description and illustration of *Hydnum molle* Fr. agree with what in North America has become known as *Bankera carnosa* (Banker) Snell, Dick, & Taussig apud Snell & al.

The description of the surface of the pileus of that species as "soft, felted, taking the imprint of a finger" (Coker & Beers, 1951: 30, as *Phellodon*) conforms to Fries's "Pileus . . . ob tomentum densum et compactum . . . tactu mollissimus." Coker & Beers described the pileus as "pure white at first, . . . later in older parts . . . light brown . . . in the central region or nearly all over", and Banker (1913: 65) as "light grayish brown at center with . . . whitish or cream colored border . . .", which conveys the same idea as the words "albo canescente".

It is no error that the stipe, described by Fries as whitish, is depicted as pale brownish in the plate executed under his direction, since these colours indicate two different developmental stages. A similar change of colour was described by Banker and Coker & Beers.

At first sight there seems to be a significant difference between *Hydnum molle* Fr. and *Bankera carnosa*, as far as the shape of the pileus of the young fruit-body is concerned. Fries stated the pileus to be umbilicate, and a few lines further he remarked: "Pileus formam habet potissimum *Paxilli*, junior convexus, disco profunde umbilicato, demum vero explanatus saepe repandus . . .", which appears in odd contrast to Coker & Beers's "caps . . . nearly plane", and Banker's "pileus . . . plane to subconvex, slightly depressed". I fail to explain this discrepancy, but it is the only one I can find, and certainly one which loses its importance with age. I am, therefore, convinced that *Hydnum molle* Fr. and *Bankera carnosa* refer to one and the same species. This shows that *Bankera carnosa* is not exclusively a North American species, but in view of the fact that it does not seem ever to have been reported since the days of Fries, it must be of extreme rarity in Europe.

With regard to the correct name of the present species, the following considerations are advanced.

When Fries published his *Hydnum molle*, the name was a later homonym of *H.*

*molle* Schw. Karsten, however, was free to use Fries's epithet in the combination *Tyrodon mollis* (see Art. 72). This name is legitimate, and of an earlier date than *Phellodon carnosus* Banker (1913), the basinym of *Bankera carnosa*. As the correct name of the species in the genus *Bankera* I herewith propose **Bankera mollis** (P. Karst.) Maas G., *comb. nov.* (basionym, *Tyrodon mollis* P. Karst., l.c., ≡ *Hydnum molle* Fr., l.c.), with *Phellodon carnosus* and *Bankera carnosa* as synonyms.

*montellicus.* — *Hydnum montellicum* Sacc. *in* Michelia **1**: 4. 1879. — *Phaeodon montellicus* (Sacc.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898. — *Calodon montellicus* (Sacc.) Bataille *in* Bull. Soc. mycol. France **39**: 211. 1924 ("*montellicum*"). — Type: "*Hydnum montellicum*" (Italy, "Veneto, Treviso, bosco Montello, in silvis quercinis", according to Saccardo, 1916: 1091) (PAD; fragment in L).

Bresadola (1920: 69) listed the present species as a synonym of *Hydnum velutinum* "Ld." I do not quite understand the addition of the author's citation, unless by it Bresadola meant to refer to Lloyd's Note 229 [Mycol. Writ. **4** (Lett. No. 56): 5. 1915]. In this note Lloyd persisted in calling a species *Hydnum velutinum*, although he was well aware of the fact that it could not be the species ascribed to Fries, Lloyd's interpretation being *Hydnum spongiosipes* of Peck. In this connection it should be remembered that the figure which Bresadola later gave under the name of *H. velutinum* (Icon. mycol. **2**: pl. 1054. 1932) also represents what (in Part II: 62) was called *Hydnellum velutinum* var. *spongiosipes*.

Reverting to Saccardo's species, it should be pointed out that *Hydnum montellicum* has no relation whatever with *Hydnellum velutinum* or any variety of that species on account of the fact that in *H. montellicum* the flesh is not purplish brown, and does not turn violet, then olive green, in a drop of KOH solution. The hyphae of the context lack clamp connections, which excludes Groups 4 to 6 of the genus *Hydnellum*. Group 2 needs not be taken into consideration, as there are neither yellowish nor orange colours in the context of pileus or stipe, whilst inclusion in Group 3 appears equally unlikely. For one thing, this group comprises two species, *H. compactum* and *H. mirabile*, with pale to whitish flesh, at least in the pileus, and both are characterized by an acrid taste. In the type specimen of *Hydnum montellicum*, the context of the pileus is fairly dark yellow-brown (in between "Sayal Brown" and "Saccardo's Umber" of Ridgway, which is well in agreement with Saccardo's description of the flesh as being fuscous), and the taste is decidedly not acrid.

Since, furthermore, the present species is not identical with any of the Hydnellums described from North America, it would seem that *Hydnum montellicum* is an independent but forgotten species. Also, it is quite likely that it will prove to constitute a seventh group. A redescription must be postponed until fresh material has been collected.

*moschatellinus.* — *Hydnum moschatellinum* Vel., České Houby 749. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia.

Judging from Velenovský's description, I have little hesitation in identifying the present species with *Bankera fuligineo-alba*. The only obstacle seems to be in the spores which are described as nearly smooth, whereas those in *Bankera* are finely tuberculate. The discrepancy may be explained by assuming that Velenovský must have had immature material. This assumption gains probability from the fact that the spines are stated to be white tinged with pink; the spines in mature specimens would have turned grey.

*multiplex*. — *Hydnum multiplex* Fr. *in* Öfvers. VetenskAkad. Förh., Stockh. **8**: 54. 1851; Monogr. Hym. Suec. **2**: 277. 1863; Icon. sel. Hym. **1**: 8, pl. 6 fig. 2. 1867. — *Calodon multiplex* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 110. 1882. — *Pleurodon multiplex* (Fr.) Ricken, Vadem. Pilzfr. 242. 1918. — Type locality: Sweden, near Uppsala, forest Nosten (Fries, 1863: 277).

While I believe that *Hydnum nanum* (see there), reported from decayed wood of spruce, is identical with *Phellodon melaleucus*, I am not so sure that *H. multiplex* represents the same. Fries, moreover, did not state that his species was found growing on decayed wood, whilst the figure shows a number of stipes springing from an apparently intact piece of bark. In general appearance, too, *Hydnum multiplex* looks different from anything I have ever seen in *Phellodon melaleucus*. I can offer no opinion on the identity of the species.

*murinus*. — *Hydnum murinum* Vel., České Houby 751. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, "prope Chlumec nad Cidlinou."

The species described by Velenovský certainly belongs to the genus *Phellodon*, and may well be identical with *P. melaleucus*.

*nanus*. — *Hydnum nanum* Saut. *in* Hedwigia **16**: 73. 1877. — Type: not in W (information Dr. K. H. Rechinger). — Type locality: Austria, "Auf morschem Fichtenholz am Dürenberg bei Hallein."

Von Keissler (1917: 108) simply discarded the present species with the words "Ist zu streichen." Yet, I believe it gives little trouble to recognize *Hydnum nanum* as a *Phellodon* on account of its white spines and filiform stipe. The glabrous surface of the stipe excludes *Phellodon confluens* and *P. niger*, whilst the colour ("fusco-cinereum"), and the smooth and glabrous surface of the pileus are characteristic features of *P. melaleucus*.

It is true that I myself have never seen *P. melaleucus* growing on decayed wood, but since in the Netherlands it is quite commonly found among vegetable debris in the sides of dry ditches at the edge of woods, I do not regard the substratum indicated by Sauter as improbable. However, see also remarks under *Hydnum multiplex*.

*nudus*. — *Hydnum nudum* Vel., České Houby 747. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 273. 1948); not *Hydnum nudum* Berk. & Curt. *apud* Berk.

*in* Grevillea **1**: 100. 1873. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Říčany.

Velenovský compared his species with *Hydnum cyathiforme* Schaeff., which is a synonym of *Phellodon tomentosus*, but considering that the pileus is described as azonate, perfectly glabrous and smooth, and the flesh as white, *Hydnum nudum* obviously is not a *Phellodon*. Since the spines are said to be white, and the spores hyaline, the species may be thought of as belonging to either *Bankera* or *Hydnum*. The last named genus does not seem very likely, as the stipe is described as dark brown, and the odour as strong and pleasant. This leaves *Bankera* as the one remaining genus, but here, as in *Hydnum moschatellinum*, there is the same difficulty of the spores being smooth. Even if this discrepancy is explained away much in the same manner as in that species, there remains the difficulty of assigning *Hydnum nudum* to any of the three species at present known in *Bankera*. Perhaps, Velenosvký's description discords least with *Bankera violascens*.

*occidentalis*. — *Hydnum occidentale* Fr., Epicr. Syst. mycol. 510. 1838. — *Auriscalpium occidentale* (Fr.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — *Leptodon occidentalis* (Fr.) Quél., Ench. Fung. 191. 1886 ("*occidentale*"). —Type: represented by Paul., Iconogr. Champ. pl. 32. 1812–35 ("*Scutiger spinosus*").

The present binomial, which is the same as *Fungus atrospinosus Paul.* (see there), refers to *Sarcodon laevigatus*.

*occultus*. — *Hydnum occultum* Britz., Hym. Südbayern **8**: 14. 1891 (n.v.); Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 215, fig. Hydnei 36. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 215. 1910. — Type locality: Germany, Bavaria, Nesselwang.

The description (of 1894) of the context as "faserig-korkig-holzig", the spines as "weiss, weisslich", and the spores in mass also as "weiss" marks the present species as an indubitable *Phellodon*. The most salient features of the species, as shown in Fig. 36, are (i) its yellow, azonate, infundibuliform pileus which is radially streaked with brown from the centre outwards, and bordered with a white margin, and (ii) its dark brown, long, and flexuous stipe which seems to have a smooth surface. These characters combined exclude *Phellodon confluens* and *P. niger* (which have no yellow caps, and a spongy tomentum covering their stipes), as well as *P. tomentosus* (which has a conspicuously zoned pileus). This leaves *P. melaleucus* as the only possibility, even if it is true that I have never seen such a striking colour pattern of the pileus in any specimen of that species. It should, however, be remembered that perhaps *P. melaleucus* is the most variable species of its genus as far as colours are concerned, and in this connection I may refer to *Phellodon brunneoolivaceus* and *P. brunneoroseus*.

*odoratus*. — *Hydnum odoratum* Vel., České Houby 748. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mnichovice.

The original account is strongly suggestive of the description of old specimens of *Bankera fuligineo-alba.*

*o l i d u s.* — *Hydnum olidum* Berk. *in* J. Linn. Soc. (Bot.), London **16**: 51. 1877. — Type: "*Hydnum olidum* B. / Japan / *F. V. Dickins*" (K).

The type consists of two specimens in good condition. The coriaceous pileus and the white spines mark the specimens as belonging to the genus *Phellodon.* From the olivaceous colour of the pileus, the thick tomentum of the stipe, and, above all, the tough and black core in the context of the stipe, there is not the slightest doubt that *H. olidum* is identical with *Phellodon niger.*

*p o c i l l u m.* — *Hydnum pocillum* Inz., Funghi sicil. **1**: ?. 1869 (n.v.). — *Hydnum cinereum* var. *pocillum* (Inz.) Fr., Hym. europ. 604. 1874. — *Hydnum cinereum* subsp. *H. pocillum* (Inz.) Sacc., Syll. Fung. **6**: 440. 1888. — Type: represented by Inzenga, Funghi sicil. **1**: pl. 5 fig. 1–5. 1869 (n.v.).

Since I have not seen the original description and illustrations, I can offer no opinion as to its identity.

*p o l i t u s.* — *Hydnum politum* Fr., Anteckn. Sverige växt. ätl. Svamp. 62. 1836; Epicr. Syst. mycol. 507. 1838; Monogr. Hym. Suec. **2**: 277. 1863; Sverig. ätl. gift. Svamp. 52, pl. 90. 1866. — *Tyrodon politus* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 90. 1882. — *Sarcodon politus* (Fr.) Bataille *in* Bull. Soc. mycol. France **39**: 205. 1924 ("*politum*"). — Type locality: Sweden, Småland, Femsjö (Fries, 1866: 52).

The description supplied by Fries (1838: 507), while sufficiently clear for the genera *Hydnellum* and *Phellodon* to be excluded (". . . pileo carnoso . . .. Caro alba."), also states the spines to be white, which rules out *Sarcodon.* However, the choice between *Bankera* and *Hydnum* is harder to make, on account of some of the characteristics which cannot be reconciled.

The description of the spines leaving a "circulum nudum" around the stipe reminds one of the situation in *Hydnum repandum*, and, more especially, var. *repandum*, but then the colour 'ferrugineus' (= "rouillé foncé ou brun rouillé", according to Kühner, 1950: 29) is wrong for the stipe in that species. In parentheses, it should be noted that in Plate 90 the stipe is depicted as totally white, although both the Latin and Swedish descriptions indicate the stipe to be concolorous with the pileus. Identification of *Hydnum politum* with *Hydnum repandum* var. *rufescens*, which does possess a concolorous stipe, seems equally unlikely on account of the fact that in this variety the spines are also concolorous, not white, whereas the stipe is slender, not stocky and with a bulbous base. As a third possibility, *Hydnum politum* may be compared with *Hydnum umbilicatum* Peck, but here again the differences in the colours of the stipe, spines, and flesh make it difficult to come to a conclusion.

With the failure to recognize *Hydnum politum* satisfactorily as a species of the genus *Hydnum* sensu stricto, the one possibility left seems to be *Bankera*, of which only

*B. fuligineo-alba* would come into consideration. It appears, however, that this species is not likely either, for specimens which are so old as to have turned ferruginous in both pileus and stipe, if this colour exists at all in *B. fuligineo-alba*, would most certainly have their spines grey, not white. Moreover, the bare zone around the top of the stipe devoid of spines is not a feature characteristic of the genus *Bankera*.

Failing to identify the species, I am of the opinion that the name is best disregarded as being a nomen dubium.

*p o l y c e p s.* — [*Erinaceus niger, ramosus, non vescus* Mich., Nova Pl. Gen. 132. 1729. —] *Hydnum nigrum* var. *β? polyceps* Pers., Mycol. europ. **2**: 168. 1825. — Type: represented by Micheli, Nova Pl. Gen. pl. 72 fig. 6. 1729.

Very probably, this is a form of *Phellodon niger*.

*p o r t a e.* — *Hydnum portae* Brig. *apud* Comes *in* Ann. Scuola Agricult. Portici **1**: 116. 1878 (n.v.). — Type locality: Italy, around Naples.

As I have been unable to locate a copy of the above mentioned journal, I rely upon the description of the species as published by Saccardo [*in* Fl. ital. cryptog. **1** (Fasc. 15,: 1103. 1916]. From this it is obvious that *Hydnum portae* only represents one of the various forms of *Hydnum repandum*, as was also the opinion expressed by Comes.

*p u l c h r i s p i n e u s.* — *Hydnum aurantiacum* var. *pulchrispineum* Peck *in* Rep. N.Y. St. Mus. **54**: 171. 1901. — Type locality: U.S.A., New York, near Westport.

Very probably the type material is still at Albany but I made no inquiries. The description which Peck gave of the spines, "a beautiful persistent yellowish orange", is highly characteristic of *Hydnellum earlianum*, a species which more than once appears to have been confused with the true *H. aurantiacum*.

*p u l l u s.* — *Hydnum nigrum* var. *β. pullum* (Sw.) Wahlenb., Fl. suec., ed. 2, **2**: 1005. 1833.

An overlooked recombination which should be inserted in Part III: 53.

*p u l v i n a t u s.* — *Hydnum pulvinatum* C. F. Schultz, Prodr. Fl. stargard. 491. 1806; not *Hydnum pulvinatum* Secr., Mycogr. suisse **2**: 513. 1833 = unidentifiable. — Type locality: Germany, Mecklenburg-Strelitz, between Warlin and Rühlow, near Stargard.

Fries, in his 'Systema' (1821: 399) regarded *Hydnum pulvinatum* as a synonym of *Hydnum laevigatum*, but that is most certainly incorrect, as Schultz described the pileus of his species as membranaceous. The colour of the spines, which are said to be ferruginous, and the thin-fleshed pileus mark the species as a *Hydnellum*, but further identification appears impossible.

*queletii.* — *Phaeodon queletii* (Fr. apud Quél.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

An overlooked recombination which should be inserted in Part II: 62.

*radiato-rugosus.* — *Hydnum radiato-rugosum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 178. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 215. 1910. — Type: represented by Britz., Hym Südbayern **10**: fig. Hydnei 64. 1894 (selected).

Although in the original account the colour of the spines is not stated, it is brown in Fig. 64. From the words, "H[ut] . . . rotbraun . . . Fl[eisch] rotbr[aun] . . .; dem *H. zonatum* v[erwandt]" it is obvious that *H. radiato-rugosum* belongs to *Hydnellum velutinum.* The words "H[ut] strahlenförmig runzlig, gezont . . ." indicate that Britzelmayr's species represents one of those forms intermediate between *H. velutinum* var. *scrobiculatum* and var. *zonatum.*

Figure 29, originally (Hym. Südbayern **6**: 33. 1890) indicated as an illustration for *Hydnum zonatum*, was in 1894 considered to represent *H. radiato-rugosum.*

*reticulatus.* — *Hydnellum diabolus* f. *reticulatum* Coker & Beers, Stip. Hydn. east. U.S. 72, pl. 44 lower fig. 1951 (no Latin description). — Type: U.S.A., North Carolina, Chapel Hill, No. 14364 (selected).

To be included in the synonymy under *Hydnellum diabolus*, see there.

*rivulosus.* — *Hydnum laevigatum* var. *rivulosum* Fr., Mon. Hym. Suec. **2**: 275. 1863. — Type locality: Sweden.

This varietal epithet refers to an insignificant stage in the development of *Sarcodon laevigatus*, in which the pellicle of the pileus has ruptured into a multitude of areoles or adnate scales.

*roseus.* — *Hydnum roseum* Saut. *apud* Schiederm. *in* Öst. bot. Z. **27**: 6. 1877 (nomen nudum); not *Hydnum roseum* Raddi *in* Mem. Mat. Fis. Soc. ital. Sci., Modena **13** (2): 354. 1807 = *Hydnum repandum* L. ex Fr. var. *repandum.* — Type: not in W (information Dr. K. H. Rechinger). — Type locality: presumably Austria.

This binomial is a herbarium name which does not seem to have been published by Sauter (compare von Keissler, 1917: 108). It was enumerated by Schiedermayr without a description.

*sanguineo-fulvus.* — *Hydnum sanguineo-fulvum* Britz., Hym. Südbayern **8**: 14. 1891 (n.v.); **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 177, fig. Hydnei 42, 43. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 214. 1910. — *Hydnum ferrugineum* f. *sanguineo-fulvum* (Britz.) Killerm. *in* Denkschr. bayer. bot. Ges. **15**: 42. 1922. — Type locality: Germany, Bavaria.

I have been unable to trace the diagnosis of 1891, but the description of 1894 clearly indicates that Britzelmayr's species is identical with *Hydnellum velutinum* var.

*scrobiculatum* ("Oberfläche knollig, dabei gefurcht, grubig-faserig; Stacheln ... unter dem Hutrand weisslich bereift, dann nach unten fleischfarben, rotbraun ... Fleisch etwas mehr als korkhart, nach Mehl riechend, oben fleischfarben, weisslich rotbraun, dann nach unten rotbraun bis schwarzrotbraun.").

Of the illustrations enumerated by Britzelmayr in 1894 only Figs. 42 and 43 were maintained in 1910, and I consider them a fair enough representation of *H. velutinum* var. *scrobiculatum*, although the colours of the caps are too bright. Figure 58 may be the same, Figs. 56 and 57 seem to me to be *Hydnellum velutinum* var. *spongiosipes*.

*s c a b r o s u s.* — *Phaeodon scabrosus* (Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

To be inserted in Part I: 58.

*s c r o b i c u l a t u s.* — *Phaeodon scrobiculatus* (Fr. ex Secr.) P. Henn. *in* Nat. PflFam. **1** (1**): 148. 1898.

An overlooked recombination to be inserted in Part II: 61.

*s c u t a t u s.* — *Hydnum *scutatum* Pers., Mycol. europ. **2**: 170. 1825. — Type: "*Hydnum scutatum* / prope Versalias (Bard)" (L 910.263–897).

The specimen in Persoon's herbarium has been very badly dried, and recognition is seriously hampered by the strangely deformed surface of the pileus. Fortunately, the stipe has been severed from the pileus by an oblique cut, and the context now exposed reveals the identity of the specimen. The dark purplish brown flesh with its numerous pockets of crystalline matter, and the deep violet discolouration in a drop of KOH mark the specimen as belonging to Group 1 of the genus *Hydnellum*. *Hydnellum ferrugineum* and *H. velutinum* var. *spongiosipes* may be ruled out on account of the colour and the general appearance of the pileus. The lack of concentrical zones and the comparatively thin spongiose layer of the pileus exclude var. *zonatum* and var. *velutinum*, which leaves *Hydnellum velutinum* var. *scrobiculatum* as the only possibility.

*s e r i c e u s.* — *Hydnum sericeum* Vel., České Houby 748. 1922 (Latin translation by Pilát *in* Op. bot. čech. **6**: 273. 1948); not *Hydnum sericeum* Sw., Prodr. 149. 1788 = *Dictyonema sericeum* (Sw.) Berk., a lichen; not *Hydnum sericeum* (Pat. apud Duss) Sacc. & D. Sacc. *in* Sacc., Syll. Fung. **17**: 151. 1905. — Type: "*Hydnum sericeum* Vel., Bohemia centr., distr. Říčany u Prahy: in Piceetis apud Mnichovice, 1915, leg. Velenovsky" (PRC).

This is fully identical with *Phellodon niger*; I have seen the material.

*s e r o t i n u s.* — *Hydnum serotinum* Ch. Martin *in* Bull. Trav. Soc. bot. Genève **7**: 194. 1894. — Type locality: Switzerland, Mont Gosse, near Geneva.

Dr. C. E. B. Bonner, Geneva, who kindly supplied me with a photocopy of the original description, also informed me that there is no material to be found. Judging from the description, *Hydnum serotinum* seems to be a form of *Hydnum repandum*.

*s o r d i d e - n a e v o s u s.* — *Fungus sordide-naevosus* Paul., Traité Champ. **2**: Index. 1793 ("*sordidè naevosus*"; for description, see p. 125: Escudarde-couleuvre). — Type locality: presumably France.

This is another of Paulet's doubtful species. The description states the pileus to be characterized by "ses taches plus ou moins brunes sur un fond lavé de rouge & de jaune", but the plate (as *Scutiger maculatus*, see there) shows a scrobiculate surface. The description does not state the nature of the context, but judging from the plate it seems to be fleshy. This, combined with the dark brown colour of the spines, marks the species as a *Sarcodon*. Going by the slate blue colour of the flesh of the pileus, described as "d'un gris de cendre lavée", one could be tempted at first sight to think of *Sarcodon fuligineo-violaceus*, but the context in that species is purplish to violet.

Fries, in his 'Epicrisis' (p. 506), regarded Paulet's plate as an illustration of *Sarcodon laevigatus*, which opinion is equally difficult to maintain. Later on, in his 'Hym. europ.' (p. 600), he thought that Paulet's species rather represented *Hydnum fragile*. This species, however, is a synonym of *Bankera fuligineo-alba* (see Part III: 57). It is quite certain, considering the dark brown spines shown in Paulet's figure, that *Fungus sordide-naevosus* ≡ *Scutiger maculatus* is not a *Bankera*.

*s p a r s o - a c u l e a t u s.* — *Hydnum sparso-aculeatum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 175. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 212. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 47. 1894.

In both the original diagnosis and the description of 1910 the words, "Stachelschicht schön weiss . . . Fl[eisch] weich, weiss . . ." point in the direction of *Bankera*. The brownish colours of the fruit-body, more saturated in the centre of the pileus and towards the base of the stipe, and the absence of scales on the pileus, leave no other choice than *Bankera fuligineo-alba*.

The description of the colour of the spores as yellowish would suggest that *H. sparso-aculeatum* probably represents a *Sarcodon* rather than a *Bankera*. If that was the case, the only European species answering to Britzelmayr's figure would be *Sarcodon laevigatus*, but the smaller size of the spores (4.5 × 3 $\mu$) opposes such an identification.

*s p i n o s u s.* — *Scutiger spinosus* Paul., Iconogr. Champ. pl. 32. 1812–35 (generic name not validly published).

See under *Fungus atrospinosus*.

*s p o n g i o s i p e s.* — *Hydnellum velutinum* var. *spongiosipes* (Peck) Maas G. *in* Fungus **27**: 62. 1957. — *Hydnellum spongiosipes* (Peck) Pouz. *in* Česká Mykol. **14**: 130 1960.

Since *Hydnum spongiosipes* was published some years after *H. fuligineum* Britz. (see there), the latter epithet should take precedence over the former in case '*spongiosipes*' is considered an autonomous species.

*squammatus.* — *Hypothele squammata* Paul., Iconogr. Champ. pl. 35 fig. 3. 1812–35 (generic name not validly published).

See under *Fungus imbricatus.*

*squamosus.* — *Hydnum squamosum* Bull., Herb. France pl. 409. 1788; Hist. Champ. France 310. 1791; *ex* Nocca & Balbis, Fl. ticin. 341. 1821 (n.v.); G. F. Re, Fl. pedemont. Append. 50. 1821. — Type: represented by Bull., Herb. France pl. 409. 1788.

Incidentally mentioned in Part IV: 134. Bulliard's species represents a *Hydnellum*, but is otherwise unidentifiable.

*Hydnum squamosum* sensu Roques, Hist. Champ. 46. 1832, represents *Sarcodon imbricatus.*

*squarrosus.* — *Hydnum squarrosum* C. Nees, Syst. Pilze, Ueberblick 61, pl. 32 fig. 240. 1817 ("Pers.").

Whether this specific epithet was intended as a new name, or just written in error for *Hydnum imbricatum* is hard to say. To be included in the synonymy of *Sarcodon imbricatus* in Part I: 53.

*stereosarcinon.* — *Sarcodon stereosarcinon* Wehm. *in* Canad. J. Res., sect. C, **18**: 102. 1940. — Type locality: Canada, Nova Scotia.

The present binomial and *Sarcodon brevipes* Coker (see there) refer to the same species (Coker & Beers, 1951: 54). Wehmeyer published his species one year after the publication of *S. brevipes*, but since he did provide a Latin description, which Coker omitted, *Sarcodon stereosarcinon* is the correct name for the species.

*stohlii.* — *Phaeodon aurantiacus* f. *stohlii* (Rabenh.) Schatteburg, Höh. Pilze Unterweserraumes 311. 1956 (no reference to basinym).

This recombination, which was not validly published, should be inserted in Part II: 52.

*suavis.* — *Hydnum versipelle* var. *suave* Bres. *apud* Ambrosi *in* Bull. Soc. venetotrent. Sci. nat. **3**: 43. 1884. — Type: not known to be in existence. — Type locality: Italy, Trentino, Valle di Sella.

The only piece of information contained in the original account is that the present variety would differ from *Hydnum versipelle*, "per un odore forte, gratissimo di liquore." Even if it is assumed that variety *suave* has any relation to *Hydnum versipelle*, in other words, that it is a *Sarcodon*, it should be remembered that perhaps in no other genus of stipitate Hydnums do the species require a more detailed description, drawn up from the living material, so as to be recognizable. Apart from the odour, however, there is not a single distinctive word in the description. Under these circumstances the name must remain a nomen dubium.

*suberosus.* — *Hydnum suberosum* Batsch, Elench. Fung. 113, 179. 1783; *ex*

Cobelli *in* Michelia **2**: 238. 1881. — Type: represented by Batsch, Elench. Fung. pl. 10 fig. 45. 1783.

The original account is rather inclusive in that Batsch stated the colour to vary from grey, whitish grey, or white to brick red. For, while it is possible with a fair degree of accuracy to identify *Hydnum suberosum* from its figure as *Phellodon niger*, it is equally certain that Batsch with his brick red specimen(s?) was in error and had a totally different species, probably even a species of the genus *Hydnellum*. I am unable to say what species could be meant from the description as whitish grey or white.

*subsquamosus*. — *Hydnum subsquamosum* Batsch, Elench. Fung. 111, 177. 1783. — *Fungus subsquamosus* (Batsch) Paul., Traité Champ. **2**: Index. 1793 ("*subsquammosus*"; description on p. 124: Escudarde tigrée). — *Scutiger subsquamosus* (Batsch) Paul., Iconogr. Champ. pl. 33 fig. 1. 1812–35 (generic name not validly published; copy of Batsch's figure). — *Hydnum subsquamosum* Batsch *ex* Fr., Syst. mycol. **1**: 399. 1821. — *Hydnum badium* var. *subsquamosum* (Batsch ex Fr.) Pers., Mycol. europ. **2**: 156. 1825. — *Sarcodon subsquamosus* (Batsch ex Fr.) P. Karst. *in* Rev. mycol. **3**/No. 9: 20. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 34. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 16. 1881. — *Phaeodon subsquamosus* (Batsch ex Fr.) J. Schroet. *in* Cohn, Kryptog.-Fl. Schles. **3** (1): 460. 1888. — Type: represented by Batsch, Elench. Fung. pl. 10 fig. 43. 1783.

As already pointed out in Part I: 49, I fail to identify Batsch's species.

*Hydnum subsquamosum* sensu Bresadola, as far as the illustration (Icon. mycol. **21**: pl. 1037. 1932) is concerned, looks very different from the figure of Batsch in that the scales show hardly any contrast with the underground. I did not enquire about the presence of specimens in Herb. Bresadola at Stockholm, but found one collection among the Hydnums preserved at Coimbra ("in silvis coniferis in rep. tridentine, leg. *J. Bresadola*"). This material proves to be a *Sarcodon* (spores yellowish brown, roughly tuberculate; context made up of non-parallel, inflated hyphae) of Group 2 (context whitish in the pileus, somewhat darker in the base of the stipe; hyphae without clamps). The specimen comes nearest *Hydnum badium* sensu Lundell in having more or less free scales, but differs in being paler and more yellowish than that species. I am as yet unable to decide whether this difference is of any consequence since I know *Hydnum badium* as understood by Lundell only from dried specimens.

*sulfureus*. — *Hydnum sulfureum* Saut. *in* Hedwigia **8**: 40. 1869; not *Hydnum sulphureum* Kalchbr. *in* Math. term. Közl. **3**: 224. 1865; not *Hydnum sulphureum* Schw. *in* Schr. naturf. Ges. Leipzig **1**: 104. 1822; Fr., Elench. Fung. **1**: 138. 1828. — Type: not in W (information Dr. K. H. Rechinger). — Type locality: Austria, near Salzburg.

Although the diagnosis is very short, it clearly refers to what is now known as *Hydnellum geogenium*. Probably because Sauter was aware of Kalchbrenner's epithet, he changed '*sulfureum*' to '*citrinum*' (see there).

*sulphureus.* — *Hydnum sulphureum* Kalchbr. *in* Math. term. Közl. **3**: 224. 1865; not *Hydnum sulphureum* Schw. *in* Schr. naturf. Ges. Leipzig **1**: 104. 1822; Fr., Elench. Fung. **1**: 138. 1828; not *Hydnum sulfureum* Saut. *in* Hedwigia **8**: 40. 1869. — *Calodon sulphureus* (Kalchbr.) Quél., Fl. mycol. 443. 1888 ("*sulfureum*"). — Type: represented by Kalchbr. *in* Math. term. Közl. **3**: pl. 1 fig. 4. 1865 (if not in UPS, compare Banker *in* Mycologia **5**: 205. 1913).

A later homonym, and, moreover, a synonym of *Hydnellum geogenium* (Fr.) Banker.

*tessiniensis.* — *Dryodon caput-ursi* var. *tessiniensis*"?" Benzoni *in* Schweiz. Z. Pilzk. **16**: 180. 1938. - Type: represented by Benzoni *in* Schweiz. Z. Pilzk. **16**: fig. on p. 181. 1938.

On asking the author for the loan of his material, if there was any, I was informed by his relatives that Mr. Benzoni was a very sick man, suffering from old age.

Neither the macroscopic description, nor the photographs are sufficiently clear to enable one to decide whether the present variety belongs to *Hericium coralloides* or to *H. ramosum*. However, taking into consideration the small size of the spores (4–5·5 × 3·5–4·5 $\mu$), there seems little doubt that variety *tessiniensis* should be referred to the '*caput-ursi*' form of *Hericium ramosum*.

*testaceofulvus.* — *Hydnum testaceofulvum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 177, fig. Hydnei 60. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 215. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 61. 1894 (selected).

The context which is described as "korkigholzig, schmutzig rotbraun . . .", and the colour of the spores in the mass which is stated to be brown, unmistakably characterize the present species as a *Hydnellum*. From the words, "die Bedeckung des Hutes später faserig, etwas grubig" (1894: 177), and, "H[ut] . . . gewölbt, mit eingedrückter, oft mit Knollen oder anderen Auswüchsen besetzter Mitte" (1910: 215), I do not hesitate to identify *Hydnum testaceofulvum* with *Hydnellum velutinum* var. *scrobiculatum*.

Figure 21, originally indicated (Hym. Südbayern **6**: 33. 1890) as an illustration of *Hydnum velutinum*, was later (1894) considered to represent *H. testaceofulvum*.

*testaceus.* – *Hydnum testaceum* Brig. jun. *apud* Comes *in* Ann. Scuola Agricult. Portici **1**: 115. 1878 (n.v.). — Type locality: Italy, around Naples.

As in the case of *Hydnum portae*, the description published by Saccardo has been consulted in default of the original one.

According to Comes, *Hydnum testaceum* would be only a variety of *Hydnum repandum*, but I am not so sure of that. The description of the flesh ("caro fracta rubella") does not agree with that species. However, I am unable to offer a better suggestion.

*tischeri.* — *Hydnum tischeri* Opiz *in* Lotos **5**: 42. 1855. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mergenthal.

The description is suggestive of *Phellodon tomentosus*.

*tomentosus.* — *Hydnum tomentosum* L. *sensu* Oed., Fl. dan. **3** / Fasc. 9: 7, pl. 534 fig. 3. 1770 = *Polyporus adustus*, acc. to Fr., Syst. mycol. **1**: 406. 1821; = *Polyporus populinus*, acc. to Hornem., Nomencl. Fl. dan. 23. 1827; but both probably wrong; not *Hydnum tomentosum* Schrad., Spicil. Fl. germ. **1**: 177, pl. 4 fig. 2. 1794 = *Caldesiella ferruginosa* (Fr.) Sacc.

For the sake of completeness both denominations, one of which is a misapplication, and neither of which has any relation with *Phellodon tomentosus*, should be added to Part III: 54.

*tuberculosus.* — *Hydnum tuberculosum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 69. 1894.

From the figure it may be safely concluded that this species represents a *Hydnellum*. The colouring, such as shown externally and described internally, makes it probable that Britzelmayr had seen *Hydnellum compactum*. He actually considered his *Hydnum tuberculosum* related with that species (Fig. 68). The only difference lies in the pileus which is comparatively smooth in his illustration of *H. compactum*, densely colliculose in *H. tuberculosum*.

It may be pointed out that Britzelmayr's conception of *H. compactum* is the same as Persoon's and Krombholz's.

*tubiformis.* — *Hydnum tubiforme* Gillet, Hym. 717. 1878. — Type locality: France.

The way the pileus is described, "ombiliqué plus ou moins profondément, puis bientôt percé au centre d'une ouverture qui communique avec l'intérieur du pied", is reminiscent of the situation in old specimens of *Sarcodon imbricatus*, but several other features, such as "Chapeau peu charmu . . . jaunâtre ou nankin-clair . . .. Aiguillons . . . jaunâtres. Pied . . . blanchâtre ou blanc-jaunâtre", are convincing proof that Gillet must have had some other species which, very probably, did not belong to the genus *Sarcodon*.

Rea (1932: 47) who stated that he saw living material of this species in Britain, described it much in the same way as did Gillet, but gave the added information that the spores were "white in the mass, subglobose, apiculate, 7–8 × 7–7.5 $\mu$, with a large central gutta." This means that Rea's specimens are referable to *Hydnum repandum*. Whether this also holds of Gillet's material is hard to say.

*turbinatus.* — *Hydnum turbinatum* Brig. jun. *apud* Comes *in* Ann. Scuola Agricult. Portici **1**: 115. 1878 (n.v.). — Type locality: Italy, around Naples.

As in the case of *Hydnum portae*, the description published by Saccardo has been consulted in default of the original one.

Of the present species Briganti stated: "cum praecedente [*Hydnum testaceum*], cuius magnitudinem fere aequat et primo intuitu ejus var. deformata et luxurians videtur." Comes considered it, just like *H. testaceum*, a variety of *Hydnum repandum*.

I have no opinion myself, since there is nothing in the description to suggest whether or not Comes is correct.

*u n d u l a t u s.* — *Hydnum undulatum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p. ?, pl. 47 fig. 4. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

*u p l a n d i c u s.* — *Hydnum uplandicum* Lundell.

This is a herbarium name suggested by Lundell for a species first collected by himself in Sweden, and afterwards also recognized in material collected by Litschauer and others in Tirol. The name appeared in print and was discussed on the label of Litschauer & Lohwag, Fungi sel. exs. europ. 176—"*Sarcodon versipelle* (Fries sensu Bresadola) Litschauer in Herb.", of which I examined the copy at Vienna. That herbarium also possesses authentic material of *Hydnum uplandicum* (Flora Suecica, Upland, parish Lena, "Wald Arby", Storvreta, 27 VIII 1927, *S. Lundell*) which had been sent to Litschauer, and four more collections under this name from Tirol. The most interesting one among the last named is a collection determined by Lundell (Ost-Tirol, Tristachersee bei Lienz, VII 1932, *K. Lohwag*).

The collections are all very similar and may be characterized as follows: pileus purplish grey-brown, in some collections with the pellicle cracked into membranous, adnate squamules; stipe whitish or faintly tinged with the colour of the pileus; context white; hyphae with clamp connections. They all represent one and the same species: *Sarcodon laevigatus.*

The only point which for some time I felt uncertain about is whether *Hydnum uplandicum* should be referred to *Sarcodon laevigatus* s. str. (context remaining white, odour and taste indifferent), or to *S. laevigatus* in the sense of Bourdot & Galzin (context becoming flushed with purple, odour nauseating, taste becoming bitter). Two considerations made me decide in favour of the former.

First, Lundell regarded Bresadola's Plate 1040 as an illustration of his *Hydnum uplandicum*: "Auch er hält den Pilz für die Art, die Bresadola l.c. abbildet." (label of Litschauer & Lohwag, Fungi sel. 176). Here, Bresadola gave the following description of the flesh: "caro pallida, ad stipitis basim fuscescens, odore grato, sapore amaricante . . ." (Icon. mycol. **21**: text to pl. 1040. 1932). Whether Bresadola's plate really represents the species under discussion is of minor importance in this case (I actually believe it does not), since it only serves to show that it agrees with *Hydnum uplandicum* in having white flesh.

Secondly, one of the Tirolean collections is accompanied with some notes in Litschauer's hand, stating the context to be white.

However, I should add that perhaps the differences between *Sarcodon laevigatus* s. str. and *S. laevigatus* sensu Bourd. & Galz. are less fundamental than I originally thought, for on the same label Litschauer described the odour as "ziemlich intensiv". In this connection I may also refer to the remarks under *Sarcodon fragrans.*

*variecolor.* — *Hydnum cyathiforme* var. *variecolor* (Secr.) Cost. & Duf., Nouv. Fl. Champ. 161. 1891; not *Hydnum variecolor* Fr., Epicr. Syst. mycol. 516. 1838.

An overlooked recombination to be included in Part III: 55.

*velutinus.* — *Phaeodon velutinus* (Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 148. 1898.

An overlooked recombination to be inserted in Part II: 61.

*velutipes.* — *Hydnum velutipes* G. Beck *in* Verh. zool.-bot. Ges. Wien **39**: 604. 1889. — Type: (not in W, information Dr. K. H. Rechinger) represented by G. Beck *in* Verh. zool.-bot. Ges. Wien **39**: pl. 15 fig. 2. 1889.

The description of the pileus as "suberoso-rigidus", combined with those of the spines as "albidi serius dilute cinerei", and of the spores as "globosae, aculeatae", marks the present species as a *Phellodon*. From the characters of the context which is described as "canus serius subater et in siccitate splendens", the present species is easily recognized as identical with *Phellodon niger*.

*versipelliformis.* — *Hydnum versipelliforme* Allesch. *in* Ber. bot. Ver. Landshut **10**: 21. 1887. — Type: non-existent (information Dr. K. H. Rechinger). — Type locality: Germany, South Bavaria, around Tölz.

Since the literature may not be easily accessible, the description, a copy of which was received through the kindness of Dr. Rechinger, is here repeated: —

„Fruchtkörper rasig verwachsend. Hut fleischig, unregelmässig, oberseits faserig flockig, rötlich oder bräunlich rostfarbig. Stiel kurz, dick, etwas verzweigt, von den herablaufenden Stacheln fast bis zur Basis bestezt oder wenigstens von verkümmerten punktiert. Stacheln grau- oder umbrabraun, an der Spitze fast weisslich, weit herablaufend. Sporen klein, hyalin.

Auf der Erde in Nadelwäldern und gemischten Beständen. Um Tölz: Waldungen am Wackersberg, bei Fischbach, am Aufstieg zum Blomberg, bei Reutberg 8. und 9. 87.

Jedenfalls eine Zwischenform von *Hydnum versipelle* und *scabrosum* Fries, welche aber der ersteren Art näher steht."

The colour of the stipe is not stated in the description, but may be deduced from the following remark, ". . . während die [Fries'sche] Beschreibung des Stieles . . .: "stipite . . . cinerascente . . ." auf den bezeichneten Pilz genau passt".

Bresadola, in a letter to Killermann (Killermann, 1922: 39), considered *Hydnum versipelliforme* to be identical with *Sarcodon laevigatus*, without stating his grounds however. Considering the inadequacy of the description, I can make no better suggestion.

*versipellis.* — *Sarcodon versipellis* (Fr.) Quél., Ench. Fung. 188. 1886 ("*versipelle*"). — *Phaeodon versipellis* (Fr.) P. Henn. *in* Nat. PflFam. **1** (1**): 149. 1898.

To be inserted in Part I: 48.

*violascens.* — *Hydnum caeruleum* var. *β violascens* (Alb. & Schw.) Fr., Obs. mycol. **1**: 136. 1815.

An overlooked recombination which should be inserted in the synonymy of *Bankera violascens* in Part III: 58.

Although Britzelmayr as an artist was a man of very unequal results, he showed his ability to reach near-perfection in a number of drawings of *Bankera violascens* which he called *Hydnum fusipes* (Hym. Südbayern **10**: fig. Hydnei 37. 1894). Illustrations of lesser quality, but still recognizable, are in Hym. Südbayern **6**: fig. Hydnei 24a, 24b. 1890, and in Hym. Südbayern **10**: fig. Hydnei 48, 49. 1894.

In Part III: 59, I regarded Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 353 as one of the exsiccati representing *Bankera violascens*. Since that time I have seen many specimens of this species, both fresh and dried, and from various European countries. I have learned how to tell *Bankera violascens* from *B. fuligineo-alba*, even if they are dried, and as a result I do not now hesitate to identify Lundell & Nannfeldt's material as *Bankera fuligineo-alba*. At least it is this species in the copy of the exsiccati at Vienna, but since the Swedish series are distinguished for the homogeneity of their material, I have no doubt that all the material distributed under No. 353 comprises the same species. The smooth and shining pellicle of the pileus, its yellowish brown colour lacking any purplish tinge, the dirt embedded in the pellicle, and the stocky appearance are all unmistakable features.

*zonulatus.* — *Hydnum zonulatum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p. ?, pl. 47 fig. 5. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

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# THREE NEW SPECIES OF SECOTIACEAE FROM PATAGONIA *

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(With 21 Text-figures)

*Thaxterogaster dombeyi*, *T. brevisporus*. and *Weraroa spadicea* are described as new species. *Weraroa* subgen. *Neuquenia* subgen. nov. is described.

## 1. THAXTEROGASTER Sing.

The genus *Thaxterogaster* was first described from Tierra del Fuego in the *Nothofagus* zone of South America (1). It was then found to have been observed and described as *Secotium*, by Massee and Cunningham, also in the *Nothofagus* zone, in New Zealand, and by Zeller and Hesler in North America (also as *Secotium*). All these species were monographed by Singer & Smith (2) in a recent revision of the Secotiaceae. Now two new South American species, again from the *Nothofagus* zone, but from its northernmost part, near the Chilean-Argentine border are added, which brings the number of species known up to eight (four from Southern South America, and two from New Zealand and North America each).

### **Thaxterogaster dombeyi** Sing., *spec. nov.*

Peridio stipiteque violaceis, siccis, stipite bene evoluto, gastrocarpio vix breviore; sporis 13–15.8 × 8.2–9.7 $\mu$; hyphis fibulatis. Subhypogaeus cum *Nothofago dombeyi*. Typus in Herbario Lilloano conservatur.

Gastrocarp 13–24 mm high and 28–34 mm broad, convex above, sub-globose-compressed so that it is broader than high at maturity, with the peridium not dehiscent neither from the upper portion of the gleba nor even exposing the lower portion of the gleba at maturity since it is covered aside from the peridium by a permanent cortina which connects the apex of the stipe with the lowest portion of the peridium; peridium about 1 mm thick, surface dry, glabrous to subsericeous smooth, not splitting, violet (42–A–3, 42–A–4, 43–A–5, M & P, 1st ed.) becoming pallid when dried.

Gleba loculate with irregular (not lamellarly extended) small chambers up to 1 mm in diameter, filling the interperidial space completely, except for the columella, not dehiscent or exposed at any time, color fresh near Natal brown or gray-brown (between "thrush" and "new cocoa" M & P), dried between "cigarette" and "Sudan br." (M & P), tramal plates violet.

Stipe up to 21 × 11 mm, well developed and conspicuous from youth to maturity, typically almost as long as the height of the gastrocarp, concolorous with the peridium, solid, glabrous and naked except for the cortina, dry, broadest at juncture with lower portion of peridium, but almost subequal; columella continuous with the stipe, solid, strongly tapering in lower portion of gleba, in upper half of gleba

* Portions of the types of the new species will be deposited in the Rijksherbarium, Leiden.

oblique and thin (about 1 mm in diameter), concolorous with stipe, merging with the upper portion of the peridium; cortina well developed, concolorous with the peridium, not tearing apart, bleaching to white in very old and dried material.

Context (including peridial trama, tramal plates, and interior of stipe and columella) concolorous with surfaces, but in age bleaching to white, white in dried material, fresh inodorous, but in dried material occasionally with an odor of fish, consistently fleshy-putrescent throughout.

Spores 13–15.8 × 8.2–9.7 μ, most frequently 14–15 × 8.8–9 μ, axially symmetric with a hilar appendage continuing the axis of the spore, or with and oblique and slightly eccentrically attached hilar appendage, the ornamentation brown to ferruginous on an ocher brownish ground, consisting of a (double-layered) endosporium and a deeper colored thin episporium, covered by an exosporial ornamentation which is low and verruculose-punctate (rarely some short thin lines) and sometimes finer towards the lower end of the spore, ellipsoid, much like those of *T. violaceus* but slightly shorter in an average, not pseudoamyloid or amyloid.

Hymenium: Basidia e.g. 37 × 9.7 μ, clavate, hyaline, 4-spored, most of the sterigmata apical and straight and upright, accompanied by some shorter "empty" bodies, but true cystidia none.

Hyphae: Hymenophoral trama thin, regular, consisting of subparallel hyphae which are hyaline and not gelatinized. Peridium entirely of repent subparallel to subinterwoven filamentous hyphae which are not gelatinized. All hyphae with clamp connections and non-amyloid.

In *Nothofagus-Saxegothaea* mixed woods under *Nothofagus dombeyi*, subhypogeous. Fruiting in fall.

ARGENTINA: Rio Negro (Patagonia), Nahuel Huapí National Park, Arroyo Blest, 17 March 1959, *R. Singer M 1861* (typus, LIL).

This species keys out with and comes close to *T. violaceum* Sing., the type of the genus. It differs from it in the development of the stipe and in slightly less elongated spores. It grows, instead of with *Nothofagus pumilio*, with the evergreen *Nothofagus dombeyi*.

**Thaxterogaster brevisporus** Sing., *spec. nov.*

Peridio griseolo-albido vel pallido, gelatinascente; stipite 13–14 mm lato, albo, velo elastico-gelatinascente, haud diffracto, gleba castanea, numquam exposita; sporis angulosis, dein subglobosis, 16.5–18.5 × 13.7–16.7 μ, ornamentatione exosporiali typi (VI), IV, IV–II, IIIb, 1.2–2.5 μ projiciente, atrobrunnea instructis. In Nothofageto. Typus in Herbario Lilloano depositus est.

Gastrocarp 28–29 mm high, 22–28 mm broad, subglobose or globose, never exposing the gleba, although a veil-like continuation of the peridium, connecting the lower portion of the peridium with the apex of the stipe, covers the lowest extension of the gleba rather loosely; peridium about 0.5 mm thick or less, elastic-skin-like, loosely attached where it forms a veil-like transition to the covering of the stipe, the veil-like portion becoming almost chestnut color on drying, otherwise pallid to grayish white, somewhat viscid when fresh, smooth and glabrous.

Gleba loculate with irregular very small chambers, not lamellarly arranged anywhere, "chestnut, brownstone" (M & P) when fresh, deep chocolate brown when dried (8–J–12, M & P), tramal plates pallid, not dehiscent and exposed at any time.

Stipe short, about 11 mm long, about 13–14 mm broad below gastrocarp attach-

ment, pallid on the outside, with white tissue showing through a continuation of the veil-like portion of the peridium covering the surface of the stipe, not distinctly viscid when fresh, glabrous, smooth, equal or slightly tapering downwards, solid; columella continuous with the stipe, solid, tapering cone-like above the stipe and continued and percurrent through the upper portion of the gleba as a thin (1 mm diameter) pallid column which merges with the context of the upper portion of the peridium; veil-like portion skin-like, hyaline-pallid, elastic, gelatinous-horny.

Context (including peridial context, tramal plates and interior of stipe and columella) white in fresh and dried condition, fleshy-putrescent, with a pleasant odor (of cake).

Spores 16.5–18.5 × 13.7–16.7 μ, axially symmetric with the hilar appendage continuing the axis of the spore, the ornamentation exosporial, in early development stages gibbous-verrucose and hyaline, not colorable in cresyl blue mounts, later heavily verrucuose (small and large blunt warts, often merging into crested short ridges and connected by thin vein-like anastomoses: type (VI), IV, IV–II, IIIb, and strongly dyed blackish lilac in cresyl blue mounts), projecting 1.2–2.5 μ and covered by an indistinct hyaline perisporium, underneath a thin (0.4 μ) brownish episporium, beneath this a broad (probably two-layered) subhyaline endosporium of 2 μ diameter which is not metachromatic in cresyl blue mounts, many spores pseudoamyloid, without germ pore or callus, at first distinctly angular as *Inocybe Clypeus*-spores, at maturity becoming less angular (or angular outline less visible because of the heavy ornamentation) and more subglobose, hilar appendage mostly straight and centrally attached, rarely oblique or eccentrically attached, divided from the sterigma proper by a septum; ornamentation often heavier toward apex of spore.

Hymenium: consisting of a continuous layer of basidia exclusively (although there are also some hyaline resinous-incrusted cystidioid elements with abundant oily amorphous contents but these elements are probably basidioles or permanently sterile and morphologically scarcely differentiated cystidioles), hyaline, with or without abundant oily amorphous contents, with four straight obtuse sterigmata (e.g. 5–6 μ long), basidia very variable in length (22–45 μ), 11–14 μ broad.

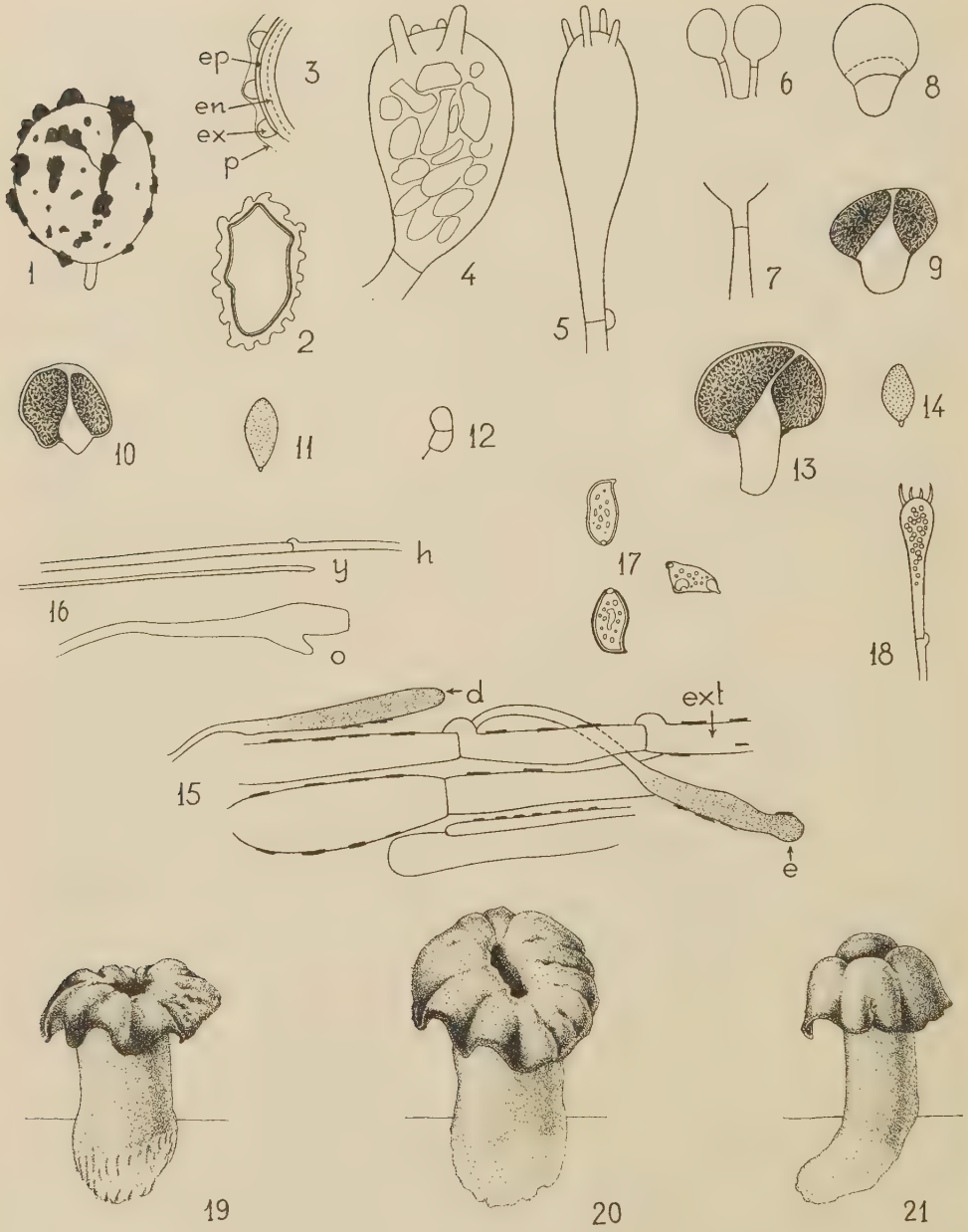
Hyphae: Subhymenium a thin layer of small irregular elements; hymenophoral trama thin, regular, filamentous; peridium consisting of thin-walled filamentous hyphae which are narrow and strongly gelatinized, wavy, repent, forming a broad layer; underneath this the non-gelatinized context of the peridium, consisting of hyaline to pale melleous filamentous hyphae which are arranged periclinally, the layer altogether not more than 80–100 μ thick. All hyphae filamentous, non-amyloid, with numerous clamp connections.

Subhypogeous in *Nothofagus-Saxegothaea* woods under *Nothofagus dombeyi*. Fruiting in fall.

ARGENTINA: Rio Negro (Patagonia): Nahuel Huapí National Park, Los Cántaros, 15 March 1959, *R. Singer M 1817* (typus, LIL).

This species keys out with *T. leucocephalus* (Mass.) Sing. & Smith but differs in spore shape and size, the high coarse ornamentation, the color of the gleba, the broader stipe, and other minor characters.

In spite of the short spores, this species is undoubtedly generically identical with the other species of *Thaxterogaster*. The angular young spores with their heavy exosporial ornamentation give the first hint, on the gastromycetous level, of the—generally recognized—affinity of *Inocybe* and *Cortinarius*. If it is assumed that on the agaricoid level, the spore wall diameter is reduced and the original non-




Figs. 1–21

resinous ornamentation is maintained, the gibbous spore type commonly found in *Inocybe* would result (as for phylogenetical problems, see my earlier paper, 3).

## 2. WERAROA Sing.

The genus *Weraroa* was first described from New Zealand (4) in 1958. It was subsequently monographed by Singer & Smith (5) and after this latter paper had been published, a further species, this time from South America, was added by Singer & Wright (6). A fifth species has now been discovered in Patagonia, one that not only emphasizes still more the affinity of the New Zealand and Patagonian mycoflora (because in this case we do not deal with a species naturally following the species of *Nothofagus*) but also shows that *Weraroa* is not only related to the dark-spored and purple-spored Strophariaceae (subfamily Stropharioideae) but, as might have been expected, also shows close links to the subfamily Pholiotoideae. The spores of the new species which is described below are of a color generally encountered in *Pholiota* and related genera and the wall is likewise thinner than in the *Weraroa* species known until now. The size, structure and pigmentation of the spores, correlated with the non-gelatinized tissue of the external layer of the peridium seems to justify the separation of this species under a special section which we propose to call *Neuquenia*.

We are grateful to Mr. José Diem who collected this rare species and also sent us a colored sketch with notes on the fresh material.

**Weraroa** subgenus **Neuquenia** Sing., *subgen. nov.*

Sporis melleo-ochraceis, minoribus, peridio haud gelatinoso. Typus: *W. spadicea* Sing.

**Weraroa spadicea** Sing., *spec. nov.*

Peridio spadiceo, haud orbiculari, sinuoso, mox centro depresso, sicco; gleba lamelliformi, maturitate libera, flavida; stipite cum parte inferiore gastrocarpii cortina ope alba fibrillosa juncto. Stipite cum columella confluente, haud tereti, glabro vel subglabro, 45–50 mm longo,

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EXPLANATION OF FIGURES 1–21

Figs. 1–9. *Thaxterogaster brevisporus* Sing.: 1—spore × 1350; 2—id., immature × 1350; 3—detail of spore wall × 1350 (en = two layers of endosporium; ex = exosporium; ep = episporium; p = perisporium); 4—basidium with oily contents × 1000; 5—basidium × 1000; 6—showing the attachment of very young spores to the sterigma; 7—id. × 2000; 8—carpophore × ½ (between stipe attachment and dotted line: the veil); 9—longitudinal section through a carpophore × ½.

Figs. 10–12. *Thaxterogaster violaceus* Sing.: 10—section through carpophore × ½; 11—spore × 500; 12—primordium.

Figs. 13–14. *Thaxterogaster dombeyi* Sing.: 13—section through carpophore × ½; 14—spore × 500.

Figs. 15—21. *Weraroa spadicea* Sing.: 15—external layer of the peridium × 600 (ext = hyphae; d = dermatocystidia; e = endocystidia); 16—elements of the tramal plates × 600 (h = hyphae; y = yellow conducting element; o = oleiferous conducting element); 17—spores × 1000 (at right an abnormally shaped spore); 18—basidium × 600; 19–21—carpophores in fresh condition × ½ (after the original painting by the collector).

basi albomycelioso, columella in peridium duplex tenue intus flavidum nec gelatinosum percurrente; sporis ochraceo-melleis, levibus, poro germinativo instructis, membrana duplici praeditis, heterotropis, 5.5–8.3 × 3.5–5.5 μ; basidiis tetrasporis, dimorphis; endocystidiis et dermatocystidiis luteo-citrinis praesentibus; hyphis peridii in strato externo brunneo-incrustatis, elongatis, parallelis, repentibus; tramate hymenophorali regulari, hyphoso; hyphis fibuliferis. Ad detritum ligneum sub *Libocedro Nothofago*que, Patagonia septentrionalis. Typus in Herbario Lilloano conservatur.

Gastrocarp reaching 25 mm in height, up to 70 × 65 mm horizontally, oval-elliptic (not orbicular) in outline when seen from above, convex above but soon with a crater-like depression in the center, this depression characteristically horizontally elongated, 22 × 8 mm, with acute margin and the latter at first in part touching the stipe-columella but later exposing the entire lower surface of the gleba, remaining incurved; peridium up to 1 mm thick, i.e. thin, consisting of an internal fleshy yellowish layer, and an external layer which is spadiceous, "sepia P" to even darker with lighter colored areas ("olive wood" M & P), not gelatinized, with irregularly wavy-grooved, dry, glabrous surface.

Gleba at maturity horizontally radially lamellar but with the tramal plates (lamellae) not wedge-shaped but of equal thickness and often forked and with numerous anastomoses, of unequal breath and even the broadest ones rather narrow, attenuate-attingent to the stipe-columella, dull yellow ocher with a slight brownish shade from the spores when seen under a lens, not shedding spores, fully exposed at maturity.

Stipe-columella 45–50 mm long, in cross section 36 × 27 mm (not terete), at first a columella portion (above the attachment of the peridium) distinguishable from the stipe proper but later becoming a typical stipe-columella, the peridium touching the stipe-columella at a distance of about 5 mm from the gleba, stipe-columella equal to somewhat bulbous-ventricose, smooth except at the base where it is often longitudinally short-furrowed, glabrous to very finely adpressedly fibrillose-squamulose under a lens, hollow when fresh according to the collector, yellowish ochraceous; volva none; cortina fibrillose, well developed, at least in young specimens, eventually disappearing, white or whitish, dry; mycelium at base of stipe abundant, white.

Context fleshy, firm, at least partly concolorous with the surface.

Spores 5.5–8.3 × 3.5–5.5 μ, ellipsoid or irregularly ellipsoid, sometimes (rarely) with a bulge in the upper inner side, with amorphous contents and small droplets, smooth, with or without a slight suprahilar depression, with a wall consisting of a rather thin ochraceous brown episporium and a likewise rather thin subhyaline endosporium which is not pink in cresyl blue mounts, with a broad hyaline germ pore and often truncate at apex, but also sometimes with rounded ends, ochraceous melleous (in $NH_4OH$); hilar appendage oblique, eccentric, small.

Hymenium: Basidia of two kinds, but of equal measurements: 27–36 × 7.5–9.5 μ, all clavate, 4-spored; normal type of basidia with hyaline protoplasmatic contents and pale lilac or violet in cresyl blue mounts; another type of basidia scattered all over the hymenium characteristically brown, mainly because of an oily guttulate brown contents, and this type showing at first (very dilute solution) bright blue discoloration of the droplets (which have a diameter of about 2 μ) but finally the whole basidium becomes deep lilac or violet in cresyl blue mounts; sterigmata generally half-sickle shaped and curved inwards. Cystidia none seen although occasional conducting elements may enter the hymenial layer slightly.

Hyphae: Subhymenium consisting of small, elongate, somewhat irregular elements forming a dense non-gelatinized layer. Hymenophoral trama (tissue of the tramal

plates) consisting of thin filamentous hyphae which run parallel with each other and the hymenium, regular, non-gelatinized, with a more hyaline lateral stratum and a more brownish mediostratum. Endoperidium consisting of thin hyphae occasionally incrusted by brown pigment, running periclinally, the whole internal layer yellowish under the microscope, not gelatinized, about 600 $\mu$ thick; exoperidium about 300 $\mu$ in diameter, consisting of broader (4–20 $\mu$ diameter) cylindric or somewhat ventricose hyphae which are parallel with each other and much stronger pigment-incrusted than those of the endoperidium, occasionally interrupted by endocystidia which are incrusted or not, bright yellow from an internal yellow granulation, long-clavate or sometimes with an apical constriction, broadly rounded above, 4–6 $\mu$ thick, entirely blackish violet in cresyl blue mounts, of the chrysocystidial type; dermatocystidia of the same type numerous on the surface of the exoperidium, at least in certain areas; conducting elements of two types, (i) bright yellow very narrow (2 $\mu$) hyphal elements, and these almost blackish violet in cresyl blue mounts, and (ii) ordinary oleiferous hyphae which are not so strongly colorable by that dye and show irregular thickenings at places, hyaline. All hyphae with numerous, often rather large, clamp connections.

On woody trash in a stand of *Austrocedrus chilensis* under *Nothofagus dombeyi*, fruiting in fall; epigeous,

ARGENTINA: Neuquén (Patagonia), Nahuel Huapí National Park, Quetrihué, 3 May 1959, *J. Diem 2875* (typus, LIL).

This species differs from all others in smaller spores with thinner wall, in the lack of a gelatinized exoperidium, in the lighter color of the spores and gleba, in the more strongly lamellar structure of the gleba and in the color of the peridium.

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C. BAS: Notes on Agaricales—II. . . . . 303
K. B. BOEDIJN: The Strobilomycetaceae of Indonesia. . . . . 315
——: A new *Scherographium* from Indonesia. . . . . 319
H. S. C. HUIJSMAN: Notes sur le genre *Agaricus*. . . . . 321
——: Observations sur les Lepioteae Fayod. . . . . 325
——: *Mycena miserior* Huijsm., spec. nov. et *Mycena preudo-picta* (J. Lange) Kühn. . . . . 331
——: Observations sur le genre *Ripartites*. . . . . 335
R. A. MAAS GEESTERANUS: Notes on hydnums. . . . . 341
R. SINGER: Three new species of Secotiaceae from Patagonia. . . . . 385

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